



COMPUTER WEEKLY

US computer fraud Bill 'technically unsound'

'Police chief sold criminal data' claim

A POLICE chief in Wheaton, Illinois, has been accused of selling criminal records from the State's police computer to a private transport company for use in screening job applicants. In a series of articles, the Wheaton Daily Journal alleged that Donald Succamonte had taken criminal histories from LEADS, the Law Enforcement Agencies Data System, and sold them to Risa International of Kansas City, Missouri. The case at present is being considered by a grand jury.

A BILL intended to fight a wide range of computer crime, at present before the US Congress, has been criticised as badly drafted and technically unsound by experts testifying to a Senate Committee.

The Federal Computer Systems Protection Bill is intended as an omnibus computer crime law that would clamp down on the increasing number of computer frauds in the US. It is sponsored by Senator Abraham Ribicoff (Democrat, Connecticut) and endorsed by the US Justice Department and the FBI. The law would broadly cover "any unauthorised act" carried out on any computer, government or privately owned, that is

used in interstate commerce, and would impose prison sentences of up to 15 years.

The Senate Judiciary subcommittee considering the Bill was told by Donn Parker of SRI, formerly Stanford Research Institute, that if the Bill were enacted in its present form a large minority of computer staff would be made criminals. It

Two computer staff at Northern Gas in Newcastle-on-Tyne have been dismissed from their jobs for using computer time for private purposes, specifically for printing biorhythm charts.

makes a great many innocuous acts into felonies, while failing to cover other real crimes.

Parker pointed out that the definitions in the Bill were bad, in that, for instance, it could be taken cover even program-mable calculators and digital watches. Most programmers, Parker pointed out, use spare computer time for trivial ex-

traneous activities such as playing games, printing Snoopy calendars, or maintaining church mailing lists. It is important, he said, that these people not be lumped in with the real computer criminals.

Parker asked the Committee for more time, to allow the Bill to be considered by the computer community at large.

Sacked gas staff appeal to tribunal

The men are David Finan, an operations shift controller, and Stephen Foster, a programmer. Finan is taking Northern Gas to the Industrial Tribunal for alleged unfair dismissal.

The reason for dismissal was given by Northern Gas as "gross misconduct" which was "directed towards personal financial gain."

Finan and Foster had placed an advertisement in a newspaper offering personal biorhythm charts for sale. Finan, however, claims that they never sold anything — that the advertisement was exploratory. Finan also claims that someone in the Northern Gas management knew what they were doing and even asked for his own biorhythm chart; so they assumed there was no objection to what they were doing.

The case will be heard in Newcastle on July 27.

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'Criminals gain too much knowledge'

CAREER criminals are becoming increasingly knowledgeable about computers, the Senate Judiciary Committee was told by consultant Donn Parker, and it is important that legislation be introduced to deal directly with computer crime. At present, Parker said, many fraud cases have to be punished indirectly, as in the case of two programmers who stole \$144,000 worth of computer time but could only be convicted of mail fraud.

Parker said many companies that discover they are victims of computer fraud do not reveal the fact, because of fear of publicity, and prefer to write off their losses as book-keeping errors.

Parker added that he hoped the legislation would not lead too rapidly to the licensing of computer systems or staff. "The technology is changing too rapidly to have enough standards or generally accepted good practices against which to certify or qualify for licensing," he said.

Data Preparation

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Briefing 'Triple hospital budget' call

A REPORT to the West Midlands Regional Health Authority has called for its budget for information services to be tripled — an increase of £4 million a year. Most of this would go towards providing minicomputers for hospitals to reduce their reliance on central systems which, the report says, are overloaded.

The Regional Users Group, which produced the report, was set up to find ways of making medical information more readily available to hospitals and doctors. It found that the Health Authority spends 0.5% of its budget on information services, which the group feels is not nearly enough.

GEC ops go back

THE 16 operators sacked by GEC over an industrial relations dispute (CW, July 9) will go back to work at the Stoke, Coventry, plant on Monday. They have accepted the company's offer to take the matter to ACAS for independent arbitration.

35-hour week call

SUPPORT for the Post Office Engineering Union's pursuit of a 35-hour week has come from the Civil and Public Servants Association whose Post and Telecommunications group secretary, Jeannie Drake, says "We're helping to make their industrial action as effective as possible." Meetings have been taking place between the POEU, the Post Office and Lord McCarthy, who was invited by the DoI to make recommendations to the two parties. A further meeting takes place today (Thursday).

Rejected

OPERATORS and programmers at Brighton council belonging to NALGO have had a request for regrading turned down by the council. Their case has now been taken up by NALGO and will be heard by the grading appeals committee of NALGO's South East England Provincial Council.

IBM setback

HIGHER costs, including expenditure on increased capacity to meet growing demand for its products, reduced IBM's profitability in the second quarter. Profit was a modest five per cent ahead at \$69.1 million despite a strong 11% advance in turnover to \$492 million. Sales of all equipment were up 14% at \$1,900 million, while rental and service business advanced seven per cent to \$3,000 million.

Doctors' 'No'

DOCTORS at the BMA annual meeting at Cardiff passed overwhelmingly a motion that no doctor should be party to recording information about patients on a computer system that cannot safeguard confidentiality. Strong criticism was voiced of the Child Health computer system proposed by the DHSS (CW, May 4).

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by PO policy'

compete in overseas markets, he said, resulting already in thousands of lost jobs. Dynamic claimed that lack of accountability accounted for the PO's failure to develop progressive policy. He recommended that its monopoly be transferred to a statutory agency which would be the Post Office or any others it saw fit to transfer. He also asserted that Parliament had no right to demand technical advice and that outside the UK, such as in the US, should be commissioned.

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MPs to debate port delays

CONTINUING discontent among shipping agents over delays caused by the computerisation of imports procedures at seaports, is to be the subject of the adjournment debate in the Commons tomorrow, July 21.

The debate will be led by Julian Ridsdale and Peter Rees, who are Tory MPs for Harwich and Dover respectively, two of the eight ports where HM Customs is implementing the controversial systems.

Agents at Harwich began to express discontent about three months ago when implementation of the system there started, and earlier this month Ridsdale wrote to the Chancellor of the Exchequer, Denis Healey, asking for an immediate inquiry into the working of the new procedures and what steps he was taking to improve imports clearance times.

In a written reply, the Chancellor said he would

not order an inquiry but was "looking into" ways of improving clearance times. No clear answers were given to two other questions about what actual clearance times are at the moment, and about what part of the cost of introducing the systems will be borne by shipping and forwarding agents.

The system being implemented at the eight seaports will hold databases of duty calculation rates and prohibited goods and will enable imports to be cleared online by HM Customs officials equipped with terminals.

The delays creating the problems have been caused mainly by changes in paperwork and procedures rather than faults with the computer equipment. The whole project was first described in detail in Computer Weekly more than two years ago (CW, March 11, 1976).

Real time net from CEEB

IN an effort to improve software standardisation on all its real time processing applications, and to provide a programming language for use by non-computer specialists, the Central Electricity Generating Board is developing a new software system, called Compass, which will be made available to outside suppliers (writes Peter Hewitt).

Although licensing details have yet to be finalised, Compass is aimed particularly at ensuring machine independence and is specifically intended for distributed processing networks.

Compass will be made available to outside equipment manufacturers who will be able to supply complete applications systems to the CEEB, although control and maintenance of the system software will be handled entirely by the board.

The initial development of Compass will cater specifically for plant monitoring, modulating control, and data logging systems. A pilot scheme in the area of modulating control is expected to be in operation by the middle of next year.

The second phase of the development will extend Compass to include sequence control, alarm handling, visual display, and history recording. General release of the software is planned for the end of 1979.

A CEEB spokesman pointed out that although the timescale of the development is ambitious, many of the system components already exist. For example, the CEEB has already developed two products based on high level interpretive languages for direct use by engineers, Ddacs and Sweepspeed.

The new language would be based on this existing work, he said. There would be a two stage translation process, the first step

Wirth hits at Ironman

INSTEAD of developing a new language to form its standard for real time applications, the US Department of Defence would have been wiser to opt for an existing language that had been in existence a few years.

That is the view of Professor Niklaus Wirth, who is best known as the designer of Pascal, which was the basis of all four languages developed to meet the DoD's "Ironman" requirements.

Professor Wirth was speaking at York University.

Full report, page 7.

Design Brief

Micro Logic is Data Logic's microprocessor division. They apply microtechnology to real situations. They advise, design and assemble. Almost certainly, if anything can be done with micros they can do it.

One of Micro Logic's clients had a very special requirement. One hundred portable systems, each to contain a processor and store, a floppy disc drive, a visual display unit with keyboard, and a printer. Why so special? Because the application called for each unit to weigh less than 20 lbs and to fit into a container no bigger than a standard briefcase.

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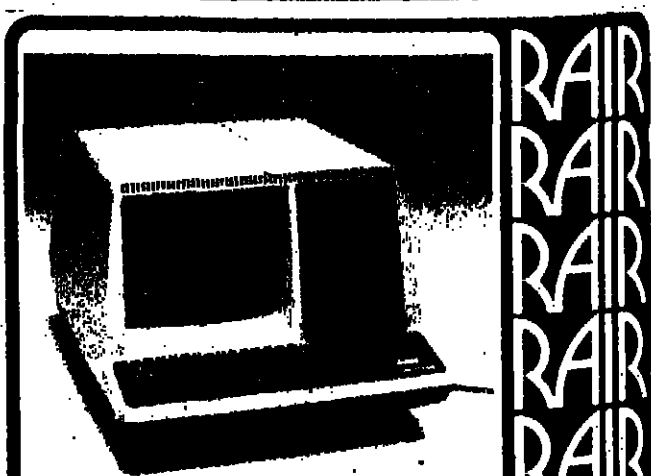
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COMPUTER WEEKLY'S INSIDE NEWS

If the supply and quality of computer supplies are not up to the mark, the efficiency of even the most sophisticated installation may be impaired. Up to 14% of annual running costs can be allocated to supplies — tape, continuous stationery, punched cards, magnetic tape, etc. — and their importance is highlighted in our special section this week (Pages 11-13).

... The problems of labour costs and unemployment among the technological community are not being given the attention they deserve, says Geoffrey Beeson. He outlines some aspects that need to be considered (Page 4).

Control Data has been doing some big business with its big mainframe, the Cyber 170. Tim Palmer reviews CDC's success with this range of machines (Page 8).

ALSO...
Computers on responsibility
Focus on staffing
Amendments to MVS
The value of labour
Downtime by Ched
US interest in viewdata
Mobile's Privateview
Programmer Notes

BA orders two IBM 3032s

INDUSTRY sources indicate that British Airways has ordered two IBM 3032 computers. It is not certain whether they will replace the two 370/158s that run the BABS reservation system or BA's five ageing 360/65s.

A could not comment on the order but said that it would make "an important announcement" in about a month.

Turn to Page 18

APPOINTMENTS: PAGES 20-40

It's all right world, we're only programming

IT is very easy for computer professionals to become so wrapped up in the delights of their technology that they forget about the ends, for which computers are only the means.

Yet computers can be as lethal as a gun or as beneficial as a brain surgeon and the computer professional who designs the system should not be absolved from some responsibility for its effect.

This concern should extend to informing and alerting "the outside world" to the effect of the technology.

The question of responsibility is most graphically illustrated by major systems which enter the political arena. The US government, for example, has stated that it regards some computers in the same category as military weapons, and has banned the sale of certain systems to certain regimes like South Africa and some South American countries, where it is believed they may be used in inflicting human rights.

And the sale of US computers

to Russia is becoming a key factor in East/West bargaining (see page 48).

The potential impact of the micro has also been discussed at length in the mass media of late, but that nobody can be in any doubt that great changes in human lifestyles could soon be created by our technology.

There are some who argue that it is no concern of the computer professional to worry about the potential widespread effect of their systems. The argument goes, it is up to others to decide how they are used, while computer professionals are there only to get things done.

This parochial view is not uncommon and its effects can be seen in daily bread and butter DP applications as well as in the matters of life, death and human rights.

DP history of the last 15 years is one of great technical advancement but often poor application of the technology. Poorly designed and implemented systems have been the norm rather

than the exception.

Yet this would have been less likely to happen if DP professionals, particularly programmers and analysts, had been made to face up directly to their responsibilities to their users.

DP people tend to feel more of a loyalty to their technology than to their users; staff drift to the more interesting technical jobs rather than to the ones with the most appealing applications.

Sitting and programming in an ivory tower might be a comfortable way of life but it is time for the computer professional to open up the technological "secrets" as quickly as possible before the tower is stormed.

It is in this context that the Saturday "fun event" at BCS 79 (this page), aimed at children and teachers is to be welcomed. The BCS has often been criticised for its contribution to ivory tower building but it has always shown a strong concern for the impact of the technology and its latest venture deserves widespread support.

FOCUS

THERE has been no shortage of studies recently each forecasting a critical DP staff shortage in the immediate future. Perhaps if less attention and related resources were devoted to the production of the many reports, some of the more pressing DP manpower shortage would be eliminated.

The National Computing Centre, in a new study, is forecasting a "looming crisis for DP" (CW, July 13). There is a confirmed shortage — not, as one might surmise, of writers, paper or printing presses, but of DP personnel. The NCC forecasts a need for 8,000 programmers and operators to enter the industry each year over the next few years.

Control Data Institute, for instance, is estimating a current shortage of about 20,000 and forecasts a need for 16,000 new entrants each year. Employment alarm bells have been ringing for some considerable time. At the beginning of the year, Computer Weekly held a recruitment conference and in an associated editorial, stated that imagination was needed to solve staff shortages.

Few, it seems, are aware of the DP employment marketplace. The social impact of computers, whether mainframe or micro, is seldom given recognition. Computing is spreading its grip and influence across industry, commerce and society. Whether it is the monthly computerised payroll, Data-Mate or washing machine, some degree of computer technology is involved.

Demand, meanwhile, is restless. New companies are setting up shop in the UK, creating a demand for high level skills. Small level computer manufacturers and suppliers are similarly marketing their products on a national scale.

Likewise, the service industry is expanding fast. It is hardly surprising that contract staffing organisations are flourishing with a consequent benefit to the DP industry.

As ever, it is DP management

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INTERRUPT

ONE day, a college bought a second-hand minicomputer and an elderly teletype. Although the system was increasingly heavily used by the students, funds were not available for maintenance.

So the only skilled attention the teletype received was when it failed completely and an engineer was called out. Confronted with the hammering, the machine received, it functioned very well for several years.

until one day when a subtle fault developed.

On starting the computer, the Basic Interpreter typed READY on the teletype. Failure to do so indicated that the Basic Interpreter was corrupt and needed reloading. A second failure to reload suggested that the bootstrap was corrupt too. A complete reloading should have cured the problem, but not on this particular day. The teletype, functioned perfectly in Local mode but would not function online. This was serious.

Panic set in — all the keys were tried in turn, and then came a surprise. In addition to a paper tape feed, the teletype printed a character. When the teletype was then tried online, it worked like a dream. This cure was then added to the normal start-up procedure and no more trouble was experienced.

The moral: Here is may be the cause of Nothing at all.

The teletype price for this entry only. Sydney A. Lotus of Devon.

Ten years ago...

COMPUTER WEEKLY
JULY 18, 1968

THE appointment of Arthur Humphreys as the first managing director of ICL, was confirmed. Online control of operations was to be provided at Longannet mining complex in Fife, Scotland, with the installation of an Argus 400. Bureau and company services for applications requiring large computing power were to be offered on the CPS 6500 by BSA. A big expansion in sales of magnetic tape encoders in UK, was forecast by the managing director of MPS (UK). The latest of the European Computer Group was to be £12 million. By the end of the year, first batch produced exchangeable disc were expected on the market.

Taking computers a mass audience

LOW-PRICED accommodation in central London plus an adventurous programme promise to make the BCS 79 conference, Living With Computing, one of the most popular computing events for some time.

It is organised as a showcase for the work of the BCS specialist groups, and the steering committee under the chairmanship of Andrew Hinchley is aiming to appeal to a wide

audience with the three-day show culminating on Saturday, January 6 with a Computing Fun Fair aimed at a mass audience, particularly teachers

and children.

On the preceding two days, specialist groups will be holding a variety of talks, demonstrations and presentations in three groups.

The ACM will be organising an intriguing session on social impact of computing which aims to take discussion about the effects of information technology beyond the general level of recent discussions towards examining one specific area.

For out-of-town visitors, accommodation will be available at the Institute of Education, in London at the very price of £7.00 per person, night bed and breakfast (including VAT). The conference will be held at the Institute of Education, in London at the very price of £7.00 per person, night bed and breakfast (including VAT). The conference will be held at the Institute of Education, in London at the very price of £7.00 per person, night bed and breakfast (including VAT).

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For full details, contact BCS 79 Conference Organisers, British Computer Society, Mansfield Street, London W1P. Tel: 01-637 0471.

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admission with the three-day show culminating on Saturday, January 6 with a Computing Fun Fair aimed at a mass audience, particularly teachers

and children.

On the preceding two days, specialist groups will be holding a variety of talks, demonstrations and presentations in three groups.

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MICHIE'S PRIVATEVIEW

Machines must explain themselves



ONCE or twice in my life I have seen a frustrated user physically attack a machine, on one occasion mortally; the victim was a vending machine. Never was the offender given the chance to explain its misconduct, or non-conduct. But who ever heard of a machine explaining itself anyway?

I do not believe that non-walkable machines can be much longer tolerated in our human world. If we do not know how to endow the new super-fast, super-complex systems with the gift of self-explanation, then it is time we dropped them before it is too late — or started to find out how to converse with them.

The US philosophy for air traffic control envisages ultra-powerful database and scheduling computations encapsulated in giant "black boxes." What will the human supervisors do on the presumably rare occasions when the system's decision-taking skills malfunction? I trust at least, that they will restrain themselves from "vending machine" solutions, even if East Coast flights are mysteriously re-routed to Dallas or inexplicable groundings of harmless carriers raise doubts as to the system's sanity.

As control devices and their programs proliferate, their computations more and more resemble Magical Mystery Tours. And the human cargo? Theirs not to reason why, so long as the system ultimately dumps them into some acceptable output state.

In European, as opposed to American, planning for air traffic control, rather than stand-alone black boxes, the preference is for man-machine systems. Human supervisors must at every stage be able to

ask the program: "What are you trying to do?"

Lack of such query facilities has already led to the costly wreck of at least one advanced system for industrial automation. Supervisors at Royal Dutch/Shell's Humber plant finally lost their nerve. Some even deserted their control stations.

Provision of query facilities as an antidote to machine inscrutability is not quite the straightforward matter which many imagine. Interactive diagnostics and trace routines, even when sprinkled with the very best syntactic sugar, do not necessarily suffice. Such things resemble orthopaedic shoes built to correct a patient's rolling gait. They may help; but if his trouble stems from a congenital abnormality at the hip joints, then the patient also needs reconstructive surgery.

Just as there are walkable and non-walkable skeletal structures in human anatomy, so there are explainable and non-explainable computations, and the differences can be traced to the respective program structures.

Impressive achievements have been scored by programs specialised for high performance rather than for self-explanation. But ask, say, a meteorological program why it predicted rain for next week, and what do you get? At best, one or the other of the two classical evasions: Either "That's the way the partial differential equations worked out," or "A match for this week was found from a database of thousands of past weeks, and the associated record retrieved."

Ask the same question of a human meteorologist, and although his predictions may not be quite as accurate as

some of the new weather-crunchers, he wins hands down on his ability to explain them in terms which make sense to another meteorologist. The two parties to the explanation share the same mental structures for storing and computing meteorological facts and theories.

Does this mean, then, that if we are to build explanatory bridges between machines and people, we must restructure problem-solving programs in the human mould? That is precisely what it means. Either to act as replacement problem-solvers or as interpretative interfaces capable of modelling brute force operations in humanly intelligible terms. Both possibilities are under investigation in laboratories devoted to AI research. The turn towards programming systems based on "production rules" can be seen in this light.

Some have taken the opposite stand. In Sir James Lighthill's now famous "ABC," A was for Advanced Automation and C for Cognitive and CNS studies. He advised that work on B, for Bridge as exemplified in the context of that time by the Edinburgh approach to robotics, should be discontinued.

A new wind has blown. The Science Research Council's "Special Panel in Computing" is especially cheering. Pushed along by a panel of seasoned professionals, it offers a notable opportunity. The indications are that the panel will find a place for problems posed by machine inscrutability and for attempts to build conceptual bridges between human and machine problem solvers.

Donald Michie

SOFTWARE FILE-1

CICS testing pack launched by Circle

MORE details have now been released of Online Software International's interactive test controller for CICS, Interest (Software File, June 8). The successor to the company's Stop package, the software is available in the UK from Circle Computer Consultants.

As with Gemini's Oliver (Software File, April 27), a key feature of the system is that it protects live work from potential corruption by tasks under test. Test and production systems can therefore be safely combined in a single CICS partition.

The package also contains many other facilities designed to

simplify and accelerate testing in an online environment.

The system, for example, is capable of intercepting program checks and providing appropriate diagnostic information at the terminal. The terminal user can also examine and modify main storage as well as online files.

In conjunction with the latter, a useful feature is the ability to freeze task execution at strategic points for logic checking.

The system also provides an instruction execution trace and the capability to check for program re-entrancy.

Developed from OSI's storage protection package Stop, over 100 copies of Interest are said to have been installed at sites in the US and Europe.

Available both for CICS and CICS/VS, the software operates under all operating systems — DOS, OS, DOS/VS and OS/VS. It can be purchased outright for £4,200 and can also be supplied under leasing and rental plans.

The UK agents also distribute OSI's CICS/VS reference handbook (Software File, March 2). Circle Computer Consultants is at the World Trade Centre, London, E1 9AA. Tel: 01-488 2400.

RTZ help for Isam users

A PACKAGE developed by Value Computing to enable Isam users to realise the full potential of IBM's newer disc drives has been introduced to the UK and Europe by RTZ Computer Services.

Designated 3330-11/3350 native mode Isam support, the software allows users operating under Release 34 and above of DOS/VS to support Isam

on 3350 drives. It also provides Isam support on the top 200 cylinders of 3330 Model II drives.

Value's system supplies replacement Isam logic modules which are invoked automatically via modified Isam open transients. No program or job modifications are entailed other than in JCL file extent specifications.

Identical user interface makes for ease of upgrading

TWO application systems based on Burroughs equipment have been launched by Teleprocessing Computer Centre Ltd, of Slough. The systems, for purchase accounting and general ledger, can be made available either on a turnkey basis, operating on a B800 minicomputer, or as a real time bureau service.

Although the underlying software is not identical in each case, the user interface is, the company said. This joint offering thus presents an unusually attractive upgrade path.

Both systems are based on the principle of online file access and update, so that transactions affect the database immediately. Telepayments, a real time purchase accounting system, allows users to enter and verify invoices directly at a VDU and ensure about individual suppliers at any time. Remittance advice, cheques, and control lists are printed at the appropriate time in the user's office.

The system can be linked automatically to the general ledger package, Telegeneral, which accepts and verifies journal entries online. In addition to a report generator, the system includes facilities for producing an operating statement, profit and loss account, and balance sheet.

Teleprocessing Computer Centre, which operates B2700 and B4500 machines, bases its interactive bureau service on the Mercury TP and database software developed by CEI of Toulouse (CW, June 10, 1978).

Puzzler

WHEN 1,108, 1,453, 1,844 and 2,281 are each divided by a certain number, the same remainder results in all four cases. What is this mysterious number and the remainder? See page 45 for the solution.

SOFTWARE FILE-2

'Pay more attention to needs of end-users'

A CALL for computer scientists to reverse the trend towards increasing compartmentalisation and pay more attention to the needs of end-users was made this week by the father of Pascal, Professor Niklaus Wirth.

Professor Wirth, of the Institut für Informatik, Eidgenössische Technische Hochschule, Zürich, was speaking at York University after being conferred with an honorary doctorate from the Department of Computer Science.

"Computer scientists," he said, "are more and more relying on the mutual admiration of increasingly impenetrable circles of their peers. If we forget our primary role as toolsmiths — namely the creation of effective systems for users from other

disciplines — we are failing in our purpose.

"It is important to understand that computer science is a branch of engineering rather than of natural sciences. The name, which has been described as a 'harmless conceit', in practice reflects the high esteem in which science was held in the US in the early 1960s.

"In contrast to natural science, which builds in order to study, we study in order to build. It is vital that we perceive our role correctly if we are to attempt to judge our success."

Professor Wirth several times emphasised the significance of service courses run within universities for members of other disciplines.

Resistance to invariants in algorithm development

PROFESSOR Wirth met with some resistance in attempting to demonstrate the use of invariants in algorithm development.

He had previously expressed the view that program proof considerations should be carried along throughout the design process. The identification of invariants was one way of proving the program at the same time as developing it.

However, his example, a binary search algorithm, provoked the objection, from several that the invariant selected:

$\{A[i] \leq x \leq A[j], i+1 \leq j\}$ for searching an array $A[0] \dots A[N]$ was by no means obvious. Instead, it was argued, its identification depended on a considerable amount of previous experience and skill, comparable with that involved in selecting substitutions in integration.

Professor Wirth subsequently conceded that the use of invariants did not fall easily into novices' training courses. He had, however, successfully introduced the technique into refresher courses for scientists and engineers with a few years' programming experience.

Surprise enthusiasm for personal computing

A CLEAR enthusiasm for personal computing was a surprising feature of Professor Wirth's presentation. His excitement stemmed from a year's sabbatical spent at the Xerox research laboratory at Palo Alto where all staff members have their own minicomputer, the Alto.

Experience with this system had prompted him to initiate a similar project at the Eidgenössische Technische Hochschule, he explained. This project involved the department in building its own 64K word microcomputer system, including a cartridge disc unit and bit-map displays.

Hardware for these systems would be built around the required software functions and would include microcoded interpreter for the only language supported, Module 2. As much as possible of the other software would also be implemented in hardware, including facilities for text editing, file management, and testing and debugging programs.

The constant availability of a personal computer offered many advantages over a shared central service, he said. It also exposed computer professionals to the first time to computer-based tools for managing their everyday work other than computing activity.

Such experience was salutary, he suggested, as the computing community has not until now been noted for using the tools it developed for others.

One of the most valuable assets, he had discovered, was a highly effective text editor. The development project, apart from providing the tool required for the work of the school, would also be a valuable learning experience: one of the compartmentalised he most regretted in computer science was that which tended to deny software engineers any understanding of the hardware they use.

The things he said...

ALTHOUGH originally an electronic engineer, Professor Wirth is most noted for his contributions to the advancement of software, particularly language design and programming methodology. Some of his observations in this area included:

• "Our knowledge about economy of design is now negligible, following the reduction in cost of computing equipment by decimal orders of magnitude over the last ten years. This has obsoleted time-consuming studies of optimisation."

• "With the advent of the microprocessor, I expect to see the demise of the general purpose computer. Instead the most generally-used computers will be special-purpose microcomputers."

• "Man has a traditional reluctance to change his toehold: An objector to structured programming once complained to me 'What is your methodology worth if it like debugging?'"

PETER HEWITT REPORTS ON PROFESSOR WIRTH'S TALK AT YORK UNIVERSITY

Enhanced version of Modula on the way

PROFESSOR Wirth, who was responsible for the design of Algol W and Modula in addition to Pascal, revealed at York some details of an enhanced version of Modula, designated Modula 2.

Originating in 1974 with a project to investigate multi-programming, Modula 2 in a sense represented a merger of Modula with Pascal, he said. His aim, however, had been to develop a tool quickly for implementing system software, rather than specifically to develop a new language.

He had chosen Modula as a basis because of its more modern syntax and had added modules and processes suitable for expressing concurrent operations.

Specific borrowings from Pascal included pointer and variant record features, and other extensions included facilities for set processing and FOR statements.

The language had been kept

deliberately skinny (excluding for example dynamic arrays) to minimise the size of the machine code nucleus required and it was intended that even the lowest level modules would be written in the language itself.

• The computer science department at York University is known for its work on developing a highly efficient compiler for Modula on the PDP-11/40. A small, concise, language, it differs from Pascal primarily in its provision for modular as opposed to monolithic program construction. It is intended primarily for programming small dedicated computers used in a real time environment.

Professor Wirth, who noted that when designing a new language he always used it to write the compiler, interested many with news of a new compiler for Modula 1. Written in Modula 1 for use on PDP-11s, it was developed by Dr V. K. Le at Cem, Geneva.



There is no place on the terminal for interactive logical debugging. Interactive programming is the greatest destroyer of program quality and the use of interactive facilities should be restricted to the text editor for clerical tasks. — PROFESSOR WIRTH

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PROGRAMMER NOTES

Why BOC thinks 1900 user's dreams are answered

THE ICL 2900 Series is a true program development machine, the answer to a 1900 programmer's dreams. Such is the feeling at BOC Datasolve at Sunbury-on-Thames, where a 3M byte 2970 is a run on a bureau basis, along with an Amdahl V5 (soon to be a V6) and multi-processor IBM 370/158.

According to Datasolve's customer liaison manager, 1900 users notice a tremendous change for the better with 2900. The changes are apparent in two main areas: ease of compilation and use of high-level languages in general, and debug facilities.

Compilation and loading are made easier because on the 2900 the programmer does not have to concatenate — or in 2900 terminology, collect — all external references for a routine.

Instead, object code is placed in virtual storage and the Cascade Loader takes care of unsorted references. The Cascade Loader in effect loads all referenced library modules at run-time.

On the debug side, gone are the well-loved memory dumps in octal and character form. The reason is the incorporation of an Object Module format diagnostic package, usable with any of the high-level languages compilers.

The diagnostics package uses information supplied by the compiler. The extent of this information is governed by a programmer-specified diagnostic level code, used as a compiler option.

The package can report the line number within a routine where a failure occurred, the mnemonic names and values of any variables, and trace the statement back to its root.

The stack oriented hardware architecture of the 2900 makes this root tracing simple, because each CALL and its parameters are logged on the stacks.

Various errors are automatically caught with hardware traps, such as an index being floating-point overflow, and mismatching of TYPE on a CALL statement.

Even the languages are better implemented than in the majority of 1900 sites. Cobol, for example, contains declarative debug sections, which are only declaratively executed, perhaps on reference to a file or field name. A run-time switch governs their execution even when the dependent conditions are satisfied.

Even writing Teleprocessing applications

is easier on the 2900. Rather than use the 1900 Driver package with its special verb- and screen layout considerations, under 2900 Cobol the programmer uses ACCEPT and DISPLAY to read and write from the terminal.

A screen template ensures the program independency from layout considerations. TP programs are easily tested in batch, when the ACCEPT and DISPLAY verbs default to use the card reader and line printer.

In general, standard ICL 2900 software has proved acceptable for use on a bureau machine, but certain deficiencies have had to be countered.

One minor source of irritation is the accounting information yielded following a terminal session or batch run. VME/D records usage adequately but its reporting suffered from shortcomings and Datasolve has built its own system to produce weekly statistics.

Another problem was ICL's test data generator which, being batch oriented, involved the online user in excessive work. Consequently Datasolve has written its own interactive version, which enables mistakes to be corrected as testing proceeds.

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'Cyber 170 is our product line for 1980s' says Control Data

FOR a company sometimes predicted as the next casualty in the mainframe computer business, Control Data is doing extraordinarily good business with its Cyber 170 large-scale mainframe product line — and making money out of it.

"Overall our systems business is as profitable as our peripherals and services business," says John Tittsworth, executive vice-president for systems at Control Data. "People questioned the need for ever more processing power, but the models at the top of the line, the new 175-100, 200 and 300 and the 176 are sold out through the first quarter of 1979. We have shipped over 200 Cyber 170s since July 1975, and are scheduled to ship about 100 this year."

"Orders are currently 30% up on last year and our backlog is up by 10%."

The Cyber 170 line starts at the 171, rated at about the same power as an IBM 370/148, and the top-end Cyber 176 is claimed to be 25 times as powerful.

"A 175-300 offers more power at the same price as IBM's 3032. When running a 70% scientific, 30% business application mix, a 175-300 rates only five times as powerful as a 171, where a 3032 rates only three times as powerful as a 3033."

The line represents a major effort on CDC's part to bring together and harmonise its mainframe operating systems. Two are offered on the Cyber 170 line: NOS, Network Operating System, and NOS Batch Environment. NOS is an improved version of the Kronos operating system introduced on the 6400, and NOS-BE follows on from Scope, which came in with the 6600.

"NOS is designed for heavy interactive time-sharing usage, and NOS-BE is of course primarily for batch working. But the two are becoming more compatible and will be merged into a single operating system," says Tittsworth. "The name may change, but the Cyber 170 is our product line for the 1980s."

Two years ago Control Data was talking about moving further into the general purpose mainframe market.

"We are strong in the scientific processing market and always have been," says Tittsworth. "But our users want to run their business applications on our machines as well. Indeed we have one West Coast customer who runs a 70% business-30% scientific mix on a Cyber 170, and in Europe, customers like the Danish PTT and banks in France and Spain run 100% commercial

applications on 170s."

The Cybers are 60-bit word machines with up to 256 K-words of main memory. On the 170, fast bipolar memory is used, giving a transfer rate of 27.5 nanoseconds for one word. Extended core storage of 512K, one or two Megawords, can be added.

The 176 CPU is built in emitter-coupled logic. It has a 12-word instruction stack and nine independent functional units, most of which are segmented. Thus several parallel pipelines can run simultaneously. It has eight 60-bit open end registers, eight 18-bit address registers and eight 18-bit increment registers, and much of the administrative workload is removed from the processor by use of anything from 10 to 20 peripheral processors. These each have 4K 12-bit words of memory and 12 or 24 input-output channels, each with a maximum transfer rate of 2 Megabits per second. The same basic architecture is used throughout the line, with slower, lower-cost components being used in the smaller models.

The most obvious requirement from the enormous processing power of the 176 is in weather forecasting, but they are also being used in seismic applications — "one major oil company wants two 176s,"

comments Tittsworth. "Ford is using one for work on engineering structures, and in nuclear research."

The 170 line as a whole is cornering the market in the high technology end of the petroleum industry, and in large power management systems for electricity companies.

The legendary New York blackout last summer brought home the need for such systems to electric utilities. Even so, says Tittsworth, fewer than two dozen of the 3092 electrically supplied have such systems. The systems offered by Control Data require a dual Cyber installation and cost up to \$15 million.

The education market is also important for Control Data, and 13 universities which have never previously used CDC computers have installed Cyber 170s, and in manufacturing, 15 new users, including GE and Rockwell have put in Cyber 170s. "Overall, 25-30% of orders have come from new customers," notes Tittsworth.

The systems business contrasts with the rest of CDC's activities in that it is predominantly foreign. Some 40% is done in Europe, 20% in the rest of the world — including two Cyber 172s to the Peoples Republic of China for oil exploration applications — and only 40% in the US. CDC is

inactive in Japan, where no comparable product exists, and the company is currently reviewing the Japanese market.

As well as doing good business with large systems, CDC is a major user of its own mainframes in its services business, and this will expand with the growth of the Plato educational system. "They also help us to sell a large number of peripherals," says Tittsworth.

The experiment of charging customers according to the use they make of software packages — "usage pricing" — has yet to be evaluated, but CDC recognised early the growing value of software and charges all software separately.

A feature of the 170 line which brings Tittsworth great satisfaction is its reliability. "One hundred Cyber users were polled recently, and 75% gave them better than four out of five for reliability," he says.

Univac wins \$30m orders for 1100s

ORDERS totalling over \$30 million for large-scale 1100 systems have been announced by Univac. The orders come from Japan, Spain and the US.

In Japan, an \$11.4 million 1100/82 system is to be installed by the Kyushu District Agricultural Co-operative, to handle banking and credit requirements.

In Spain, where Univac has a larger share of the market than in most European countries, a \$4.6 million 1100/42 will replace an IBM 380/40 at the Banco Espanol de Credito in Madrid. The bank already has two 1100s, an 1100/42.

Two national US contracts make up the balance. Ames 1100/42 is replacing a 380/40 at a Control Data 6800 at the National Oceanic and Atmospheric Administration. It will be used for marine geodetic data systems, and to produce economic reports for the National Marine Fisheries Service. Worth \$9.1 million, it is to be installed in September, and conversion is due to be completed early in 1980.

Communications for 38 active satellites is to be handled by a new Univac 1100/22 system to be installed at the National Aeronautics and Space Administration's Goddard Space Flight Centre in Maryland.

The 1100/22 will be funded by five Univac V77/60 minicomputers, and the contract is worth \$4.98 million in total.

By TIM PALMER

THE two-year-old promise by a US Congressional committee for a "basement-to-attic" overhaul of America's 1934 Communications Act has been fulfilled. And with its fulfilment has come another promise: sweeping changes will be made to the country's telecommunications policy and the industry structure.

The newly-proposed legislation would adopt, as official federal policy, open competition in the provision of all communications services. Among the Bill's major provisions are de-regulation of the communications industry; the ability for common carriers to provide non-telecommunications services through a separate subsidiary; the severance of equipment manufacturing operations from any common carrier that offers non-competitive telecommunications services; and replacement of the Federal Communications Commission by a smaller, more streamlined commission.

Banking terminal enhanced

AN enhanced version of its well established banking terminal system has been introduced by Datasab AB, and the Swedish company's UK subsidiary has installed its first Alfaskop VDUs.

The new banking terminal system is called the D16/10, and is built around a new Datasab processor based on the company's D5 minicomputer. By contrast the new D16/30 business system uses a Computer

Automation mini.

The D16/10 offers full software compatibility with the existing systems, and comes with intelligent workstations based on the Intel 8080 micro.

Customer for the Alfaskops is S. Hilton of Preston, UK distributor for the high-quality carpets manufactured by Ege Tappet of Denmark. The terminals are used for stock queries and order processing.

US Bill to reshape the comms industry

Cameron Davis reports from Washington

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Further, the newly-created National Telecommunications and Information Administration within the Commerce Department would be replaced by a

new National Telecommunications Agency, which would operate as an independent policy-making arm of the executive branch of government.

As for the common carriers, the Bill would make competition fuller and fairer, the sponsoring congressmen claim. The proposal would allow "any common carrier" to provide any service which the new CRC deems telecommunications-related, if the service is offered through a separate subsidiary.

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VAN DEERLIN... legislative proposal introduced in the House of Representatives.

Three new models of Level 6 mini now available in UK

ANNOUNCED four months ago in the US (CW, March 3) three new models of the Level 6 minicomputer are now available in the UK.

The new machines are at the top of the line, and consist of the Model 43, which is little different from the 6/43 it replaces; the Model 47, which adds facilities to the Model 43 which make it particularly effective in commercial applications; and the high-performance general purpose Model 53.

Honeywell is offering 18K-bit memory chips on the Level 6 line, and the eight memory slots in the chassis will now accom-

modate a Megaword on main storage.

Disc drives with 256 and 128 Megabytes capacity have been added, which carry 12-disc packs as well as the existing 5-disc packs. A double-sided diskette unit completes the introductions, and some Level 6 cartridge disc drives have been reduced in price by about 25%.

The Model 43 starts at £5,500, the 47 and 53 at £14,000; the two high capacity drives cost £21,300 and £18,000 respectively; and the diskette drive costs £1,800.

Wang small mainframe launch

THE new Wang 2200 VS small mainframe has now been formally announced for the UK market, and for convenience has been packaged into three basic configurations, designated WCS/50, WCS/60 and WCS/80.

The machine is claimed to be the only processor in its class with a true virtual storage operating system, and to cover the performance range between IBM's System 34 and 370/135 machines (CW, June 22).

Principal target for the new Wang machine is likely to be IBM System 3 users wanting to move to interactive computing, and the machine will compete with DEC's PDP-11 line through to the 11/70, with the Data General Eclipse and Hewlett-Packard's 3000 series.

The 2200VS ranges in price from £40,000 to £300,000 in the UK.

IBM PoS system offers new-style receipts at Tesco

RECEIPTS like the one pictured right, with product descriptions as well as prices, are now being presented to customers at Tesco's Wellingborough, Northants, supermarket when their shopping is checked out using the IBM 3880 point-of-sale system installed there.

The IBM system at Wellingborough is the first PoS system to be installed at a Tesco supermarket and will be used to evaluate the technique and to determine customer and staff reaction. The EPOS, Electronic Point of Sale, project, as it is called, will last two-and-a-half years, after which long-term decisions will be taken on the wider use of PoS, according to Tesco.

Tesco plans to evaluate laser scanning of bar coded product numbers pre-printed on grocery items, but at the moment it is labelling each of 5,000 items at the Wellingborough store with a unique eye-readable product number.

The number is keyed in at the check-out by the cashier and relayed to the back office minicomputer which looks up the price and product description from a file on disc. This information is then transmitted to the check-out and printed on the receipt.

When the IBM 3032 and 3031 mainframes cur-

QUICK-JEL	.094
PKT CAKE MIX	.264
SUGAR STRNDS	.17
TOTAL	3.39
CSH TEND	3.50
CHG DUE	.11

17/06/78 10:37 3368/3
CHECK OUT TESCO PRICES

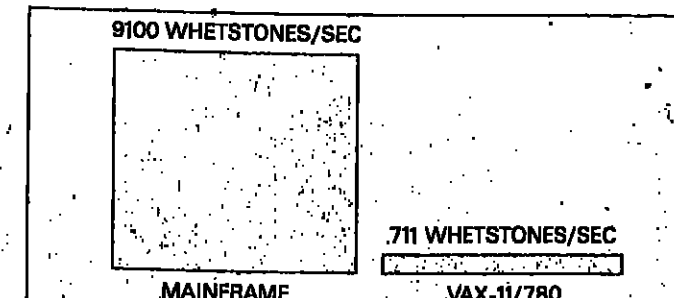
rently being installed by Tesco at its Cheshunt, Herts, headquarters are fully operational the disc file at Wellingborough will be updated via a Post Office link to Cheshunt.

The IBM mainframes are replacing existing equipment at Cheshunt that includes three ICL 1904S machines (CW, November 17, 1977).

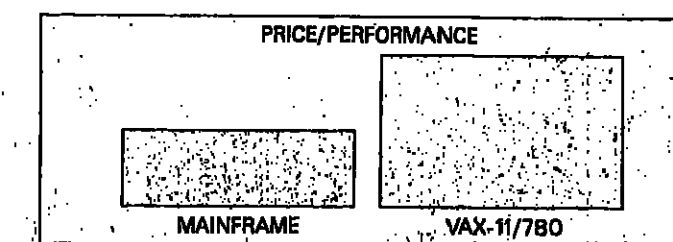
Digital's VAX-11/780 takes on the world's leading scientific mainframe.



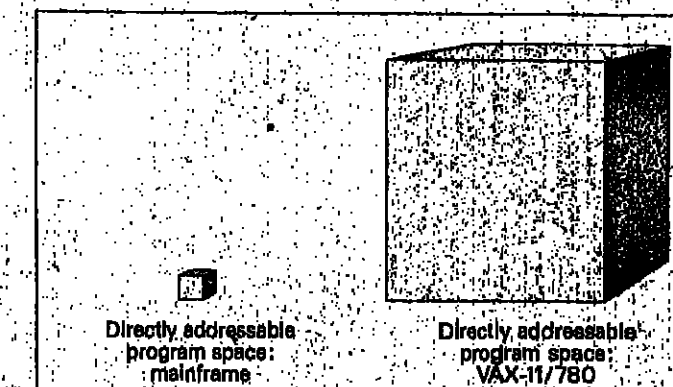
Round one to the 60 bit mainframe: Speed. The mainframe is still the speed champion with 9100 Whetstones per second.



Round two to VAX: Price/Performance. The 32 bit VAX is the world's fastest mini. A VAX system runs 711 double precision Whetstones. That's one twelfth the speed — at one twenty-fifth the cost. A dozen VAX systems could equal the throughput of the mainframe system — and you'd still save literally millions of dollars.



Round three to VAX: Program size. Virtual addressing and a gigantic 32 bit address size, compared to the 18 bit address size of the mainframe, allows VAX a directly addressable program size that is — are you ready? — 1000 times larger than the mainframe.



Get the VAX facts: Get mainframe FORTRAN performance without waiting in a batch queue — or paying batch prices. If you have an application in aerospace computation, signal processing, simulation, educational computing, industrial automation, or any other big FORTRAN job, get the VAX facts today. Write for your copy of the VAX-11/780 brochure and complete technical summary.

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Digital Equipment Co. Limited,
Digital House, Kings Road, Reading, RG1 4HS.
Tel. (0734) 683656.

Please send me the VAX-11/780 brochure.

Name: _____
Title: _____
Company: _____
Address: _____
Tel.: _____ Application: _____

digital
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Victorious in the T-shirts worn by the company's men and women competitors and a large fan club who cheered their efforts, are winning men's team from Peterborough Data Processing standing left to right are systems engineers Jeff Bennett, John Leigh, Paul Butler and Keith Wilson with Male Supersuper of the Midlands, Dave Beardsell kneeling.

Triumph for Peterborough and Scicon

THE grey summer broke into a cheery sunny smile in Birmingham on Sunday, July 8, to provide an ideal setting for the final regional heat of the DP sports event of the year, Computastars.

Held at the New Alexander Stadium, Perry Barr, which was officially opened last month, the Midlands heat turned into a triumph for the teams from Peterborough Data Processing and Scicon Computer Services, although there were some close results.

In the ladies' individual event, there was only 1/2 point separating the two leading contestants with one event to go.

But programmer Jean Eyre from Scicon won the most testing race in the competition, the steeplechase, to take the Midlands Wonder Women title with 32 points, followed by the gallant J. Heath from Peterborough DP with 27 1/2 points.

Jean, together with her Scicon team mates, tape librarian Jennie Harvey and client adviser Lorna Ackers, won the ladies' team event with 62 points, with the Peterborough ladies runners-up with 73 points and British Industrial Plastics third with 66 1/2 points. All three teams will be invited to the Crystal Palace Finals on September 30.

The Peterborough men went one up on the girls by winning

both the team and individual events. Systems engineers Jeff Bennett, John Leigh, Paul Butler and Keith Wilson worked hard and well in support of their number one man, Dave Beardsell, to take the men's team title with 157 1/2 points, closely followed by the team from UCC in Birmingham with 151 points.

The men's teams to go through to Crystal Palace from the Midlands will also include the third and fourth teams, Scicon I and ICL Scientific Languages, Kidsgrove, together with the winners of the Plate competition, the DP men from chemical manufacturers Diversey of Northampton.

Dave Beardsell took the individual title, although he was well beaten in the dreaded final steeplechase event by a dramatic late sprint from John Britton of JCL. In the overall event, however, John was two points behind Dave, who topped the table with 34 1/2 points.

After the long, enjoyable, but for the competitors, tiring day, those who failed to reach the finals contented themselves with some refreshing drinks and talk of "wait until next year". While those who had won their way to the culmination of the 1978 Computastars said goodbye with an adios that went something like "See you at the Palace."

A novel way of taking the "killer" water jump in the steeplechase...



Programming 2800 compilers is a long way from the mind of John Britton as he attempts a save in the goal kicking event. John, of ICL Scientific Languages in Kidsgrove, was a brave runner-up in the men's individual event.

Come to the Grand Final

All is now set for the Computastars Grand Final to be held at Crystal Palace in London on September 30.

Full details of the day's plans will be published shortly. Judging by the regional heats that have taken place throughout the summer, the day will prove to be an enjoyable family outing as well as a test of the skill, speed and stamina of the competitors.

Computastars has been organised by John Goldsmith's Computer Services, with Gordon Cairns doing a magnificent job not only in the preparations be-

fore the events but in handling the complex and difficult organisation of the day's events. Anyone who is willing to help Gordon in the refereeing and marshalling at Crystal Palace can contact him on 01-828 6366 at 15 Buckingham Palace Road, London SW1 0PP.



PEOPLE

Financial controller at Data General

APPOINTED controller of European operations with Data General is John Gardner, who was previously financial director of Rolls Royce, and before that, European controller for General Foods.

Gardner will be located at Data General's Paris HQ, and will be responsible for financial control of sales and service operations in the UK, France, Switzerland, West Germany, Austria, Belgium, the Netherlands, Sweden, Denmark, Italy and Greece.

Liberal candidate

CHAIRMAN of Safe Computing, Philip Rule, has been elected chairman of the Liberal Candidates Association for 1978/9, and as such will represent the Association on the Liberal party's National Executive Council.

Rule, who established Safe Computing in 1973 and who is also chairman of Quadrant Computer Services, is Liberal candidate for Lichfield and Tamworth, and a member of the party's Parliamentary Advisory Committee on Small Businesses and the Self-Employed.

Malcolm Lewis-Fry, formerly a director of Sigma Software, has become systems marketing director of Symtec Systems. He has also been computer officer at the Associated Examining Board and National Chairman of the Business Computer Users' Association.

David Tarrant becomes marketing director of Racal Redac, with special responsibility for the company's operations in France, where a sales office is to be opened near Paris. Previously, Tarrant was marketing manager of Plessey Microsystems. He replaces Ken Wyatt, who has transferred to the US to become a vice-president of Racal-Redac there.

Elywn Wareham, previously sales manager with Leasco Software, has joined Systems Designers Ltd as sales manager responsible for industrial and other non-defence sales.

Soccer

Results:
Division I: Rank Xerox 2, Jadpu 5; Gryphon 2, Comshare 0; Jadpu 3, Gryphon 4; Datascan 1, SIA 2.
Division II: Atkins 10, ICL 0; Lichfield 2, John Lewis 5; Lambeth 1, ICL 3.
Division IV: UCCL 1, C.J. Bees 3; C.J. Bees 1, Wellorax 2; Wellorax 2, Bund D.S. 1; Targa 3, UCCL 1.
Division V: Allen 14, Hoptons 0.

AUGUST 6-8
Computers, communications and technology transfer, European conference on Information Technology, Information Processing Association of Great Britain.

AUGUST 21-24
Operational data security workshop, University, London, ICL, 17-18 August 18: 01 283 4399, ext 347.

AUGUST 21-25
Cybernetics and systems fourth international congress, World Organisation of General Systems and Cybernetics, of Technology, Blackburn, tel. 0254 64321.

AUGUST 22-25
Conference on parallel processing, University of Illinois, Urbana, USA.

September 7-8, 1978
European graphics and interactive techniques conference, For. Computing Machines, London, Georgia, USA.

AUGUST 28-SEPTEMBER 1
Eight Australian Computers Conference, Australia Computer Society, Canberra.



AT F International's staff managing director Susan (above) received a birthday present of a bouquet. Other presents made were to founder director Steve Shirley - a specially signed ring in the shape of the International pin - a gold watch for long service to five members of staff: Sue Alaway, Diana Hale, Sue Prince, Elaine Taylor and Tomlinson, and a retirement present to accountant Geoffrey Baynes.

Tony Denton, a recruitment consultant with Trident Computers, has been appointed manager, Southern Region, Power, Peter Lees and John Power, Peter Lees and John Power, recruitment consultants, formerly senior production system manager in Birmingham, were senior operators with Lash Transport Executive.

John Riach, previously a systems and programming consultant at CMC Computer Management Co. UK, has been appointed an associate director of CMC Southern. Daryl Wyckoff has become director of MSI Data Corp in the UK. He is a professor of business administration at the Harvard University Graduate School, and a director of Lex Transport and Hire Ltd, an American company, a resource consultant and an economics consultant.

Liveware Says by De

WHAT I WANT IS A "FUTUREVIEW" PROGRAM



TO GIVE US HINDSIGHT IN ADVANCE!



WILL IT TAKE INTO ACCOUNT THE MISTAKES...



YOU WOULD HAVE BEEN IF YOU HADN'T BEEN FOREWARNED!



COMPUTER SUPPLIES

ALTHOUGH it is mainframes, minis and micros together with their complex and often costly software that are usually in the DP spotlight, the supplies that are needed to keep the system satisfied are also of crucial importance. As John Morgan, paper products manager of J. M.

Factors Computer Supplies, points out in the opening article of our special feature, computer supplies can amount to about 14% of the total cost of an installation. In the public's mind, computer supplies, such as "paper with holes" and whirling tape decks are actually believed

to be the most significant features of a system.

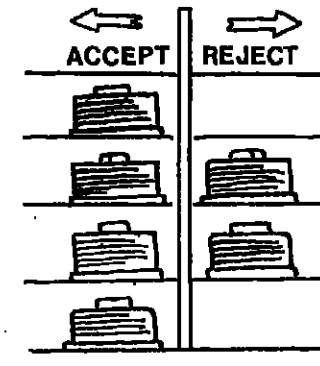
Paper is the main subject of the articles on page 12 by Keith Flack, and on page 13 by Cliff Brown, chairman of the continuous business forms manufacturers section of the British Printing In-

dustries Federation. The whole area that could be considered under the term "computer supplies" is discussed in the overview article by Morgan. And Ferdi, our cartoonist, provides a different focus on the uses to which computer supplies could be put.

Supplies can account for up to 14% of annual running costs

By John Morgan

DISC PACK
QUALITY CONTROL



"Pull!"

read/write head of a disc drive and the recording surface of the disc or cartridge being so minute, even the smallest particle of smoke or dirt can cause problems.

Therefore a comprehensive media inspection and cleaning service should be regarded as an essential item of preventative maintenance.

Paper products can be subdivided into two sections: standard "off the shelf" items such as listing paper, punched cards and paper tape; and the complex area of pre-printed or bespoke forms.

Listing paper consumption is forecast to reach £37 million by 1980 despite attempts to reduce consumption by the use of microfilm, laser printers and general paper economy.

It is very much a "baked bean" product varying little in quality and price but greatly in the way its suppliers sell it and service their customers with it.

With forms manufacturers in recent years competing in almost a price war in the sale of listing paper, the buyer will often find that the difference between suppliers is one of supply rather than cheaper prices.

On the other hand pre-printed forms are probably the hardest of all products to buy, as there very nature means that there must always be an element of risk involved.

Once the ink is on the paper, one is committed to the particular format, nothing can change it and any errors may have to be lived with for a year or more.

The professional supplier of forms should be able to demonstrate his understanding of this problem.

Advice should be available as to the suitability of various papers and forms make-up for a particular application and how suitable they are for the high speed printer involved. This advice would of course include an

appreciation of any ancillary equipment involved and subsequent handling of the form.

In fact, the attitude of the supplier should be one of tailoring his printing press to suit the users' forms require-

ments rather than, as so often happens, re-shaping them to meet narrow, "standard" printing parameters.

One test of a truly dedicated forms supplier is whether he is as willing to supply very small quantities of 1,000 forms as he is the large order.

Often regarded as a low priority purchase, advances in manufacturing techniques in recent years have resulted in printer ribbons with user life three or four times greater than previously obtained.

The latest ribbons, made of synthetic absorbent fibres, are stronger than nylon and will hold up to 20 per cent more ink. Because the ink is in the fibres rather than on the surface, it causes less smudging of print image.

The reduction of image smudge means that the print density pressure on the printer can be reduced, prolonging ribbon life even more.

The term "ancillary equipment" embraces paper and magnetic media storage equipment, fire-proof safes, binders

for print-outs, dust screens and forms handling equipment.

The latter particularly requires enlargement as it is a term which is applied to forms decollators, bursters and guillotines and also folding, enveloping and mailing equipment.

All have certain paper tolerances and limitations which should be taken into account when ordering forms. Most forms handling equipment is of foreign manufacture although there are two UK producers. The equipment varies in performance and robustness as well as price and when buying one should cater for future needs as well as current since most equipment will last five years or more.

To summarise, the range of computer supplies is extensive, with specialist suppliers in each product area but there is a growing tendency for one supplier to offer most if not all product groups as the knowledge and expertise required for one is of value when supplying another.

Announcing the infallible check digit.

If your stationary requirements include the necessity for complete accuracy in computer input serial numbers, then the surest way to obtain this is to include a weighted check digit in that number.

This system provides your computer with a checking system to verify the serial number, but is only as good as the system that prints the check digits themselves. And, in most print systems, inevitably, errors do occur.

However, at Roffs Print, we have overcome this problem. The printing of the check digit is controlled conventionally, by a computer-controlled numbering machine, but what makes

our system unique (as far as we know), is the second attendant computer which double-checks the work of the first. Missed or duplicated numbers are thus effectively avoided.

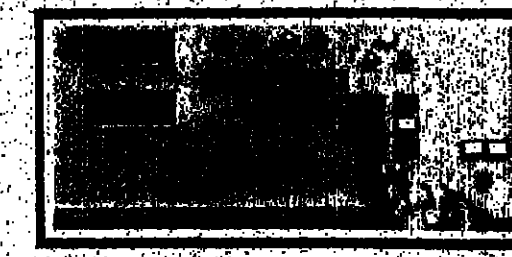
We are confident that this system of double check makes our serial number/check digit printing system infallible. Moreover, it can be applied to any part of our comprehensive print service which includes the production of continuous stationery of all sorts - including cheques - multi-part sets - document pads or books - and security work. Our prices may well be less than you think.

So, if your paper-work system is built around the serial number on your computer controlled stationery, can you afford to settle for anything less than our system?

For further information on how we can help, call Cliff Brown on (0326) 72778 or write to the address below.

ROFFS PRINT LTD

TECHNICAL FALMOUTH CORNWALL TR1 4JH TEL 0326 72778/9



Winning victors of the ladies' events are (left to right) programmer, Jean Eyre, who also won the individual title, tape librarian Jennie Harvey and client adviser Lorna Ackers, who work for Scicon Computer Services, 11 Milton Street.

'Carbonless' means greater security

A SUPERFICIAL appraisal by the computer department will naturally conclude in favour of one time carbon as against carbonless paper on grounds of cost, for Idem computer forms can cost up to 30 percent more. Raw material costs, alone however, give a distorted picture, and a more meaningful appraisal would be made under the heading of "Total Systems Costs," taking into account

various savings within the stationery system as a whole, made possible by the use of carbonless paper. The Idem Division's marketing team has been putting over the total systems costs story at seminars held for computer people for some time, and the story can be simply summarised. Take the performance of Idem on computer output printers.

Because there are no carbon interleaves, more copies are obtainable. You will get up to eight parts on an IBM 1403, and to get the same number using carbon would require a grade of carbon paper far too expensive to use on computer, such as one of the plastic backed film carbons.

It is in this sort of comparison that the systems costs argument shows an economic advantage for Idem. It is true that you may not need eight copies, but if you do you will need two runs with one time carbon as against one with Idem.

Another hidden expense of carbon stems from its innate "dirtiness" and tendency to smudge. After all, it is accepted that the economics of computers are largely based on savings on manpower and simplification of office systems.

Needless to say, this problem does not arise with Idem. With carbonless paper the copy image is within the paper rather than on its surface. It is therefore completely smudge-proof. Nor does it suffer from lost information due to carbon sheets that break loose from crimping — "carbon wander."

Furthermore, with no carbon to shred or otherwise dispose of, the computer department is saved one more time consuming and expensive operation.

Unshredded carbon, the extra copy, is a security risk. For example, I was once passing a building occupied by a well known credit rating firm and outside the entrance a sheet of carbon lay near a dustbin. It contained a readable copy of an intimate credit analysis of a large company. When I telephoned the company's managing director, he was, predictably, horrified to learn that his company's private financial affairs were lying on the pavement of a busy London street.

Of course carbon disposal can, in a large installation, be quite a headache. Someone is required to move bins of waste carbon at fairly frequent intervals, for 10,000 five-part sets, eight inches deep, contain nearly 9,000 yards or just over five miles of carbon.

Certainly, it is not always easy to quantify the precise economic benefits of efficiency and cleanliness, but five miles of waste can easily be costed. Also, without the bulk of interleaved carbon there is a distinct saving on storage costs.

Two identical-size standard boxes will take 200 to 250 six-part carbon sets and 350 six-part Idem sets. For the computer operator, it can easily be demonstrated that this factor alone brings about operational cost savings.

Longer packs mean fewer stops for reloading. This may not appear significant until you consider the following comparison based on a mean average running time cost of £1 per minute.

With OTC, packs containing 250 sets would require 40 stops in the course of a 10,000 set run. Idem packs, at 350 sets per pack, would require only 28. One reload would involve an average of 2.5 minutes, at a cost of £2.50. An additional 12 stops needed for OTC would cost £30 per 10,000 form run, a formidable on-cost for a high volume department.

Following on from that it should be remembered that on the computer printer there is a wastage of several sets of forms — both the tail end of the old pack and the feed-in of the new pack. Over a few months, this wastage is significant —



By Keith Flack

The headache of carbon disposal and the security risk of unshredded carbon are only two of the problems avoided with carbonless forms, says Keith Flack, marketing adviser with Wiggins Teape Idem division. "Total Systems Costing" can also reveal various savings within the stationery system as a whole.

approximately 72 sets per 10,000 set run using OTC.

Nor should one forget the complex area of computer ancillaries: decollators, bursters, guillotines, folding and inserting machines.

On all of these, carbonless performs at least as well as other papers, while on decollators it has the considerable benefit of less loading time.

These then are very briefly the sort of hidden savings apparent from total systems costs analysis, but that in itself is not quite the whole story.

The nature of the carbonless product creates opportunities for the computer operator to streamline his system, and simplicity brings its own savings.

Where a multi-part form calls for information to be screened out of certain parts of a set (a good example would be a combined invoice and delivery note set where costs and discounts may not be required to be shown on the delivery note) Idem can be very simply de-sensitised in areas where a copy is not wanted.

True, forms designed for use with OTC can have sections blocked out or covered with scramble pattern, but this renders that part of the working surface unusable — thus calling for more expenditure on larger forms to carry the same amount of information.

Where confidential information is being transmitted on, for example, pay advices, invoices and statements, Idem makes possible the simple and economic hidden entry system processing a sealed carbonless envelope through an output printer in one operation.

With the use of Idem Monoform or Action self-imaging papers, it also makes possible a host of ribbonless-entry operations on both output printers and also on input printers like credit card sets.

Vital part in payroll service

COMPUTER stationery is playing a vital role in the development of one of Europe's most successful computer payroll services. The stationery, designed and produced by BFC (Continuous Forms) of Cradley Heath, West Midlands, plays an integral part in Payfact, a payroll system which has become an overnight success for European bureau, CMG Computer Management Group (UK). Payfact attracted 100 subscribers in the first week of its operation, following the launch

User must get to know his forms manufacturer

NO feature dealing with computer supplies would be complete without a reference to computer stationery, that important commodity which so many DP managers take for granted until it fails to be delivered on time or does not match up to the expected quality.

Stationery represents only 6% of an average data processing budget, according to a 1977 BIS Marketing Research Survey. And it is perhaps for this reason that its design and purchase do not always receive due attention.

Where the dialogue between computer and purchasing functions is good then probably little is lost, but when it is not, the criterion for buying forms is often reduced to a matter of price and the computer function is cut off from a vital source of information — the forms salesman. Thus forms may not meet the needs of the computer department and become extremely expensive!

It is unfortunate that some purchasing officers, particularly those with little knowledge of print buying, assume the attitude "what's so special about continuous stationery — it's only paper with holes down the side." As anyone who has had experience of buying knows, there is a lot more to it than that, including a wide variation in the standard of product and service from computer stationery suppliers. This is hardly surprising as the business forms industry of today has an annual value approaching £80 million.

However, the industry itself is doing much to rectify this. In 1968, the continuous business forms manufacturers section of the British Printing Industries Federation was set up with the aims of increasing efficiency and profitability within the industry and to provide a means of formulating views on questions affecting it. Its membership, of just under 80, includes nearly all the main computer stationery manufacturers and it is represented on a number of influential bodies in industrial relations and standards, including International associations, and also liaises with computer users' associations.

The current chairman is Cliff Brown, managing director of Roffs Print. The opinions given in this article are his personal ones, but nevertheless, they provide an interesting look at the current state of the industry and how "forms users" can make the most of their suppliers.

One of the fundamental reasons for the diverse standards, according to Brown, is that there are so many comparatively new suppliers of business forms in the market who lack the experience which is so essential to produce this complex product. The earliest suppliers of continuous stationery were already manufacturers of business forms in the days before the widespread use of the computer. They were the producers of accounting systems, register sets, etc. used to working to close tolerances and printing from the reel, so they could change to continuous without too many problems.

During the 50s and 60s, most computer stationery was made by this small band of suppliers who invested heavily in equipment and development, working closely with the relatively small number of computer manufac-

turers and their customers. Soon they were joined by a few new manufacturers who entered the arena with a specialist product or because they were producing sheet fed forms and could see the change taking place in their market.

The situation became more complicated in the early 70s. The forms industry twice found itself stretched to capacity through extra demands placed upon it, first with the change to decimalisation and later the introduction of VAT.

At the same time, there was a downturn in the general printing industry and some jobbing printers who had no previous experience turned to what they thought was an expanding market — in fact the printing industry in general is notorious for buying equipment without first thoroughly examining the market.

Then in 1974, there was an apparent paper shortage accompanied by panic buying and overstocking followed inevitably by de-stocking and overcapacity in the business forms industry. This led to the classic case of a once healthy, efficient industry becoming a few years later, if not sick, certainly "one degree under."

The pressure on prices forced two of the early market leaders to close and a couple of others to cut back capacity rather than fill their machines with work at unrealistic prices. Nevertheless, throughout this difficult time, some companies have come through unscathed, refusing to lower their standards and continuing to invest in new equipment. In fact, the business forms industry is still one of the best equipped sectors of printing with a very high level of investment in new machinery.

In the opinion of Brown, what will emerge — and the signs are already there — is a slimmer industry made up of the original forms companies that are left and those later entrants who have specialised. Today, specialisation is the name of the game, whether it be in the size of run or a particular product.

What does all this mean to the user of computer stationery? First of all, that he has to get to know his forms manufacturer. Choosing a stationery supplier is almost as important as choosing the hardware and it is worthwhile getting to know the forms salesman, whether he be from a manufacturer or an independent forms distributor.

All too frequently, this most valuable and inexpensive source of advice is ignored or called in too late. A producer's advice will be sound and practical: it will frequently lead to improved design and faster deliveries and it could save a lot of money.

If called in at an early enough stage, a forms producer will ensure that the buyer does not receive a specification which causes needless expense. It is often easier and cheaper to design the whole form right from the initial O&M stage than to try to produce output in a format which has been drawn up with no understanding of printing methods and techniques.

There has been a great deal of investment in development work and equipment for products such as continuous envelopes and other mailing products, computer letters, check digit numbering on input docu-

ments, etc. Some stationery may appear to be more expensive than that being used previously, but in the long run this could save money if the user department can simplify clerical procedures and improve efficiency.

A visit to the printing works is well worth the time to meet the "inside people" and to gain a basic understanding of the factors involved in stationery production. A little knowledge can explain the sometimes mystifying differences in quotations, why machine proofs are so expensive, the high cost of corrections and why it is worthwhile not to order in too small quantities.

A few notes on some of these aspects will illustrate the point. These fall into three main areas: printing techniques, number of colours and paper.

Modern printing presses run at high speeds but have a long make-ready. The term "make-ready" or "set-up time" is the time required to prepare the press for printing, usually a minimum of three hours, yet a run of 40,000 forms may only take an hour to roll off the machine. There is, therefore, an optimum point, which will depend on the individual form and press being used, between run length (and capital tied up in stocks) and unit cost.

The continuous business forms manufacturers' sections of the British Printing Industries' Federation was set up in 1968 with the aims of increasing efficiency and profitability within the industry. Its membership includes most of the main computer stationery manufacturers, and the current chairman is Cliff Brown, managing director of Roffs Print who, in this article emphasises that the opinions expressed are his own. But they offer an interesting look at the current state of the industry.

It is for a similar reason that machine proofs are expensive — the press either has to be left idle awaiting approval of the design or the set-up has to be repeated. As a rule, the more complicated the form, the more worthwhile it is to consider larger quantities.

Obviously, the greater the number of colours involved in printing, the higher the price. However, if a producer is to run a job on a two colour machine, he may be able to offer the second colour at little extra. Another technique is to use screen tinting whereby a two colour job can give the impression of four colours. The forms salesman is familiar with all these facilities and can advise just what is available.

The cost of paper remains a vexed question in this as other areas of printing. In the early days of the industry paper was cheap and computer printer

time scarce. Now it is the reverse and it may be worthwhile to consider printing twice on the computer rather than running a two part set. No forms producer can afford to keep stocks of all the different paper sizes, weights and tints. With colour, there is about a 12% difference in price and the more exotic the shade the more expensive the stocks. A producer will often encourage a purchaser to buy large quantities by the reel rather than by the number of forms; rather than be left with small, unusable quantities of special paper. From the few examples above, it can be seen that once having chosen a forms producer, it is vital to discuss in detail the actual requirements. He will have the experience to draw up the final specification. After that, all the purchaser need do is place the order — and relax.

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Check out The Pussycat from Perkin-Elmer. It's a great little printer at a very reasonable price.

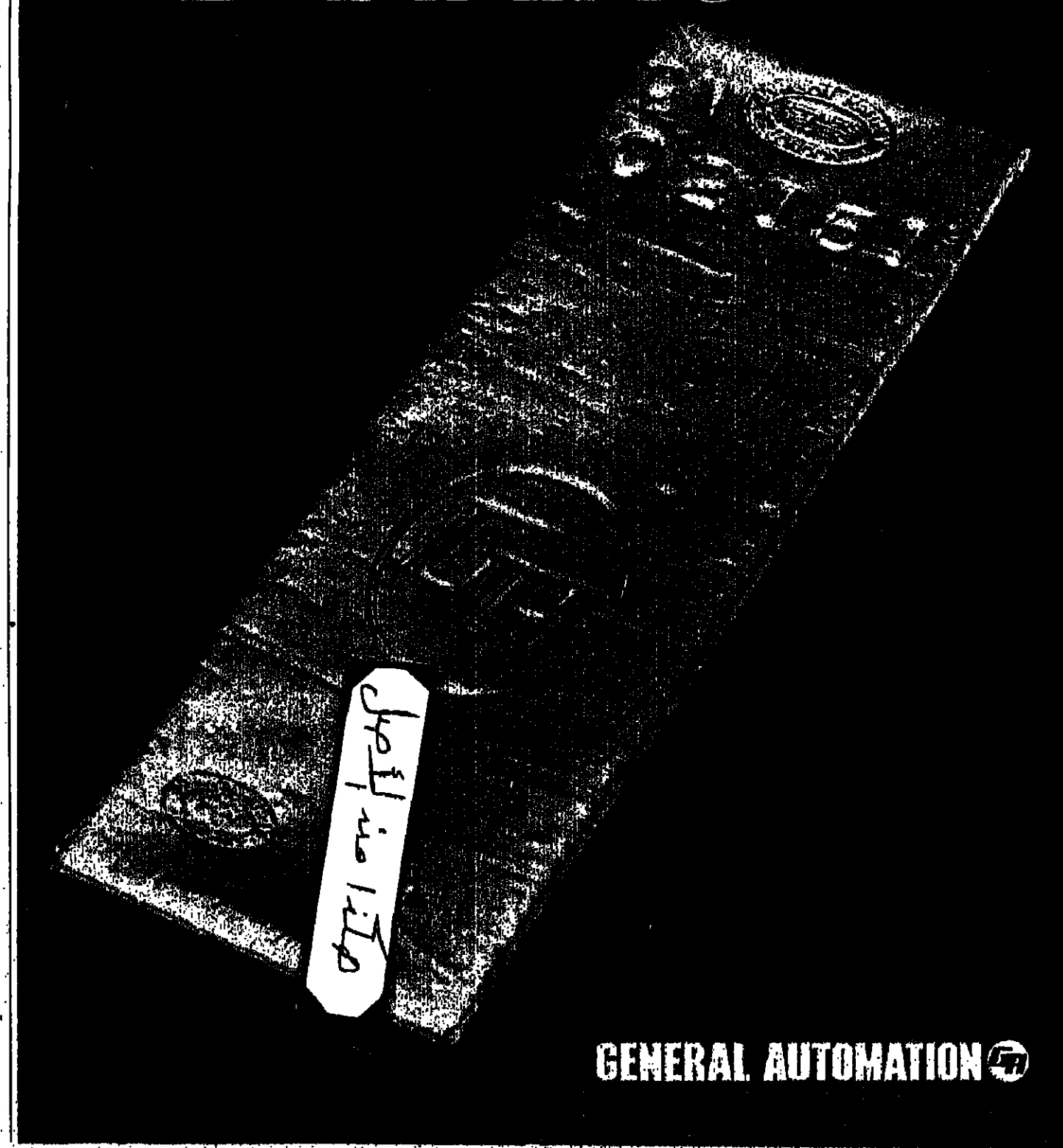
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For more information write to, or phone, Tony Beswarick at Perkin-Elmer Data Systems, Terminals Division, 227 Bath Road, Slough SL1 4AX (Tel: Slough 34511)

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GENERAL AUTOMATION

investigate
job-hunt
complaints

LORRAINE KING'S article (CW, July 6) describing her attempts to change jobs, mentions the CSA in connection with the interview she attended with recruitment companies. She implies, at least, that one or more of the companies were CSA members.

On behalf of the recruitment division of the Association, I invite her to lodge any complaint she may have with us for investigation. We, in the meantime, are investigating within the Association to discover the facts and see whether any changes are required as a result of the facts shown.

ALAN BENJAMIN
Director-General
Computing Services
Association,
Craven House,
121 Kingsway,
London WC2.

LETTERS

To: The Editor, Computer Weekly,
Dorset House, Stamford Street, London SE1 9LU

Threat to personal privacy from the State

YOUR Computerview (CW, July 6), claiming that a threat to personal privacy does not come from the State, is incorrect. In 1983, Lord Denning defined a subversive as those who "would contemplate the overthrow of the government by unlawful means", a statement that has a clear and precise interpretation. The present Home Secretary, in two recent official reports, de-

fined subversion as "action which threatens the safety or wellbeing of the State and is intended to undermine or overthrow Parliamentary democracy by political, industrial or violent means." Accordingly, "the Special Branch collects information on those who I think cause problems for the State" (see Hansard May 24 1978 (1700)).

Those definitions of "subversion" and "problems for the State", will vary from Home

ACM boycott 'misunderstood'

MUCH as I agree with the sentiments of Professor Michie's telegram, the point of the ACM boycott has been misunderstood.

If individual scientists were ousting Scharansky from his profession then the personal approach might carry some weight and have some effect. However it is the Soviet government which is initiating the persecution. As such it requires the strength of an international

boycott to carry home the message and to apply internal pressure. It requires a very strong individual to stand up against a totalitarian regime within his own country, particularly when the result of such opinions may well result in loss of profession, and civil rights.

The Irish analogy is specious since the British government neither initiates, condones nor supports torture in Northern Ireland. If it did then I suggest

that those in the Northern Ireland computer industry might well appreciate the support of groups such as the ACM and view individual protests as well-meaning but useless.

A. W. OPPENHEIMER
Brighton.

The Editor welcomes letters on subjects published in Computer Weekly or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication.

Worth a mere twopence

I AM glad to see that you appreciate the difference between the internationally agreed abbreviations M and m for mega- and milli- ("Down-time" July 6).

I am therefore very disturbed to find (on the back page) that the Department of Industry considers that microprocessor support is only worth twopence (£20m).

J. S. GATEHOUSE
GPCD product manager, Small Systems
ICL, London NW1.

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think again!

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Scharansky: A British reaction

I am very heartened that you decided to devote Professor Michie's Privateview (CW, July 6) to the plight of Anatoly Scharansky, and would like to add my name to your telegram.

However, I must strongly disagree with the view expressed on the rupture of scientific (and possibly other) relations with Russia. I feel that your view of the supposed reactions of British

scientists were the situation to be reversed, is a narrow-minded one. If the boot were on the other foot, I for one would not feel that "foreign scientists should either mind their own business or should address their protests to the Home Secretary" (sic). Nor do I believe that the main idea is to goad or shame scientists into taking the matter up with their own

government. I think I would have the intelligence to realise that any break in official relations (a) would not be intended to be a personal affront to me or my colleagues; (b) would naturally be brought to the attention of higher authority with neither goading nor shame attached.

The Soviet authorities could not ignore a number of similar ruptures in relations over a wide

spectrum from a variety of countries.

I personally think we should use all peaceful means at our disposal to express our absolute abhorrence of Russia's attitude on human rights.

CHRIS REID
Lecturer
Willesden College of Technology
London

Three collections of historic hardware

WE would like to comment on the call by M. J. Cookson for a National Museum of Computers (Letters, June 29) and in particular on his assertion that "a single gallery in a major museum" (presumably meaning the Science Museum) "is insufficient to be at all representative".

Our museums have the three major collections of historic computing hardware available to the general public in this country. Between us, we preserve a very wide range of

machines, and keep in close touch about items offered to us. We have all made strong links with the industry and with various small computing collections, eg in universities.

According to Mr Cookson, many historically significant pieces of hardware are being discarded, but he gave no reasons for this. We would offer two: either they had been offered to us and were refused as a "similar example" was already preserved in one or more of our collections, or more likely,

nobody had bothered to contact us or a local museum. It is good to know that Mr Cookson is starting a small museum, and we hope that others will follow his example, so that computing displays will be available to inform and serve the community in all parts of the country.

For the historians and scholars, let us centralise the information rather than the machines. There is certainly a need for a comprehensive register of significant pieces of

computing hardware and archival material preserved around the country — held on a computer of course!

We would like to co-operate who else is interested?

JANE RAIME
Assistant Keeper,
Science Museum, London
ALLEN SIMPSON
Assistant Keeper,
Royal Scottish Museum,
Edinburgh
JIM ANDREW
Keeper, Museum of Science
and Industry, Birmingham.

OCR scanner is 11% faster — claim

YOUR headline "Siemens introduces a fast hand-held scanner" (CW, July 6) might be misunderstood as implying that the Siemens OCR scanner is much faster than others. Actually, the Toshiba OCR scanner is 11% faster than the Siemens one, at 10 characters to the inch spacing.

More important is the variation in speed of hand movement

that can be tolerated by hand-held OCR scanners. The figures are as follows:

Caere Corp OCRReader
76-330 mm/sec
30-130 char/sec

CompuScan Datawand
up to 381 mm/sec
up to 150 char/sec

KeyTronics R1100 series
up to 254 mm/sec
up to 100 char/sec

Recognition Equipment OCR Wand
76-330 mm/sec
30-130 char/sec

Siemens OCR Scanner
50-380 mm/sec
20-140 char/sec

Toshiba OCR Hand Scanner
70-400 mm/sec
22-176 char/sec

Incidentally, the error rates of these OCR scanners differ somewhat, and the prices differ greatly.

A. WRIGHT
Senior Research Officer
Aslib,
London SW1.

Cost of entering 32-bit business reduced

THE cost of getting into the 32-bit computer has been dramatically reduced by the introduction of a 32-bit microprocessor, and the latest company to put eight of the devices into a single system is BTI Computer Systems of Sunnyvale, California.

BTI's new 32-bit system is the BTI 8000, a high-speed, 67.7 nanosecond bus which transfers data at up to 80 Megabytes per second (CW, June 29).

Designed for real-time time-sharing applications, the 8000 supports over 500 simultaneous users, and up to eight CPUs can be plugged into the bus. The microprocessor level is designed for efficient execution of high-level languages, currently available languages are BASIC, FORTRAN, COBOL, and Pascal. The system is designed to be expandable, and can be configured to run, albeit with a delay in response time.

The operating system enables each user to run his own virtual machine, and BTI is working on a development which will allow any type of terminal to be interfaced to the 8000.

Mainstay of BTI's product line has hitherto been the BTI 4000, a time-sharing computer programmed in extended Basic and based on the Hewlett-Packard 21 MX minicomputer. Some 650 of these have been installed, and the BTI 8000 supports all software written in extended Basic for the 4000.

BTI started in 1968 as Basic Timesharing Inc., but in 1975 began developing time-sharing systems. It has an office in London, and plans to launch the 8000 on the European market in about nine months' time. The first 10 systems were sold to existing 4000 users in the US prior to formal launch.

Typical target markets are time-sharing bureaux and general DP users running batch systems who need to go on line to reduce their personnel costs. In the US, a basic 8000 system with one CPU, 256K bytes of memory, eight ports, a 32 Megabyte disc drive and a tape cartridge drive costs \$58,850.

OP SPOT

Working with ICL and Amdahl

FOR a building originally designed for use as a supermarket, Datasolve House in Sunbury is an impressive computer centre. Security is tight and it accommodates customer support and systems programming staff in addition to the operations and data control personnel necessary to run the company's ICL 2970 and Amdahl 470/V5.

The 470/V5 is the first Amdahl machine to be installed by a company in the UK, and Datasolve uses it to provide online bureau services under TSO, such as APL and RJE.

Like the two 370/158s, the dual-processor configuration at Datasolve's Oxford Circus site, the 470/V5 runs under IBM's MVS operating system. So the company has transferred a number of its operations staff from that site to Sunbury in order to run the machine.

One such person is Bob Sketchley, a shift supervisor who has been in the employ of Datasolve for four years. We had a brief talk and he compared the 470/V5 with the 370/158s from the operator's viewpoint.

"Quite simply," he said, "the Amdahl is in a class of its own. For example there is one job which used to take two-and-a-half hours on the 370/158s and now takes about 40 minutes on this system."

In fairness to IBM I must point out that a more valid comparison would be between the IBM 303X series and the 470/V5. However, Sketchley's example does indicate the power of the Amdahl processor in practical terms.

In the main, staff at Datasolve House are dedicated to one or the other of the two systems. Head of the entire ICL operation is Mike Gardner who explained how his department is structured.

"I have a staff of 40, which comprises systems programming, customer support and operations."

He described the operations section. "Mike Bower is responsible for the actual machine, and we have a chief operator, three shift leaders, plus three operators per shift. There are also two line controllers for the TP network."

On the day of my visit shift C was on duty and I spoke to shift leader Reg Miles who explained how the 2970 workload is structured. During prime shift it is split up in the following manner:

About 45% is dedicated to work for MAC, an interactive, multi-access system with database. Basically it is used for program development and editing. About 30% is taken up by Transaction Processing, a real-time, interrogation, update and report production service which

builds a database and permits the manipulation of data.

The remainder is shared between batch work and RJE.

Miles next told me about the operating systems he has used in the past and compared them with that currently running on the 2970: VME/B, release 5X27.

"I have operated under ICL's George 1, George 2, George 2+ and the Manual Exec, and life is much easier with VME/B. The reason for this is that the system schedules its resources dynamically but leaves the operators in overall control."

"Datasolve operators have been trained to a greater technical awareness of VME/B and we have at least one person on each shift who is an expert at 'dump cracking', regardless of the fact that the development of VME/B has gone smoothly."

He went on to describe the procedure followed by operators when a system error occurs.

"First, we determine whether it is hard or soft. In the case of a hardware error, we find which

unit is responsible and reconfigure the system as appropriate. ICL engineers are on-site from 8.00 am to midnight, after which there is always someone on standby who will get to the installation within an hour of being contacted by the operators. Miles continued, "In the case of a software error we contact either customer support or systems programming, depending on whether it has been caused by a user job or the system itself."

In the case of a problem with the operating system, one person who is likely to be contacted is Sue Darlow who has "been

involved with VME/B right from the very beginning."

She said, "We depend greatly on the operators for our diagnostic information. With VME/B, system loops are one of the most difficult problems to resolve, and the operators must be careful to trace the loop properly so that we can sort out the cause."

"As for system dumps, the operators hand them over to us while they are on prime shift, but on the night shift they usually look at the dumps themselves. We are on call should a serious problem arise."

RJE links to the system are co-ordinated by two line controllers, one of whom is Chus Collison, transferred from data control at another Datasolve site.

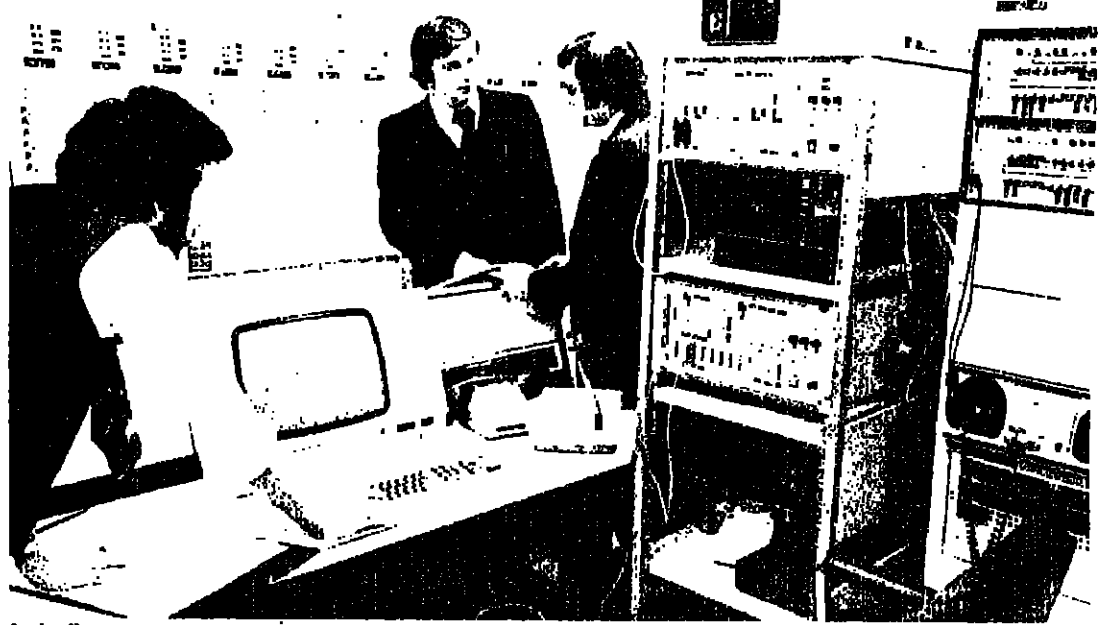
He said, "Basically, I connect customers to the 2970, ensuring that the discs to be used are on the system, and that the appropriate lines are available."

Describing his role in greater detail, he added, "At any one time we might have seven or eight MAC customers online, each using both VDUs and the slower teletype devices. The system shares the available resources between such users and the transaction processing and RJE work."

The telecommunications software of VME/B has been the object of much criticism, so I asked Collison to relate some of the problems he faces in this sphere.

"Difficulties sometimes arise when we try to reconfigure a line after it has gone down. We overcome this by repatching the line or, in other words, switching it to another channel," he said. According to Collison, the users experience no inconvenience when this occurs, and the fault is expected to be eliminated with the next release of VME/B: 5X32.

The line controllers work from 8.00 am to 6.00 pm, after



At the line controllers' station, Chus Collison (on the left of the picture) carries out a hardware check-up, as shift leader Reg Miles and Dave Brown discuss the 2970 workload.

which the mainframe operators take over, "as they are trained to look after that side of things," as Collison puts it.

Although Amdahl 470/V5 and the ICL 2970 are treated as separate operations, the operators do get trained on both machines. This adds further interest to the work and provides cover in the event of holidays and staff sickness.

Dave Brown, a senior operator working with the ICL machine, said, "The Amdahl is a very interesting machine — definitely faster than the 2970. Also you have to communicate much more with the 2970 than the Amdahl."

After spending three weeks working on the 470/V5, Brown wrote an operators' guide to the system, or a "noddly guide" as he calls it.

Data control is the one section where the Amdahl and ICL systems are dealt with by the same staff on a full-time basis. I spoke to Richard Gabb, the data control supervisor.

"It doesn't really matter to us which machine the work is to be run on because the procedure we follow is the same in both cases," said Gabb.

"We receive 'over the counter' work, we have a quick look at the job card to see that it's all right, and then we submit the work to the system. The user will specify whether or not any errors are to be corrected by us."

The section checks all work printed in-house to see that it has run properly and that the output is complete. The work is then sent to the user by first-class post or delivered by van.

BCS Group

THE operations Specialist Group of the British Computer Society is in the process of drawing up a schedule of its meetings for the coming year. It should be ready by the end of July.

Any person who wants a copy should contact Barrie Patman, BCS Datasolve, 14 Old Park Lane, London W1. Telephone: 01-498 7098.

Potential Data Control Staff

should attend the Infotech Operations training course Data Control Techniques.

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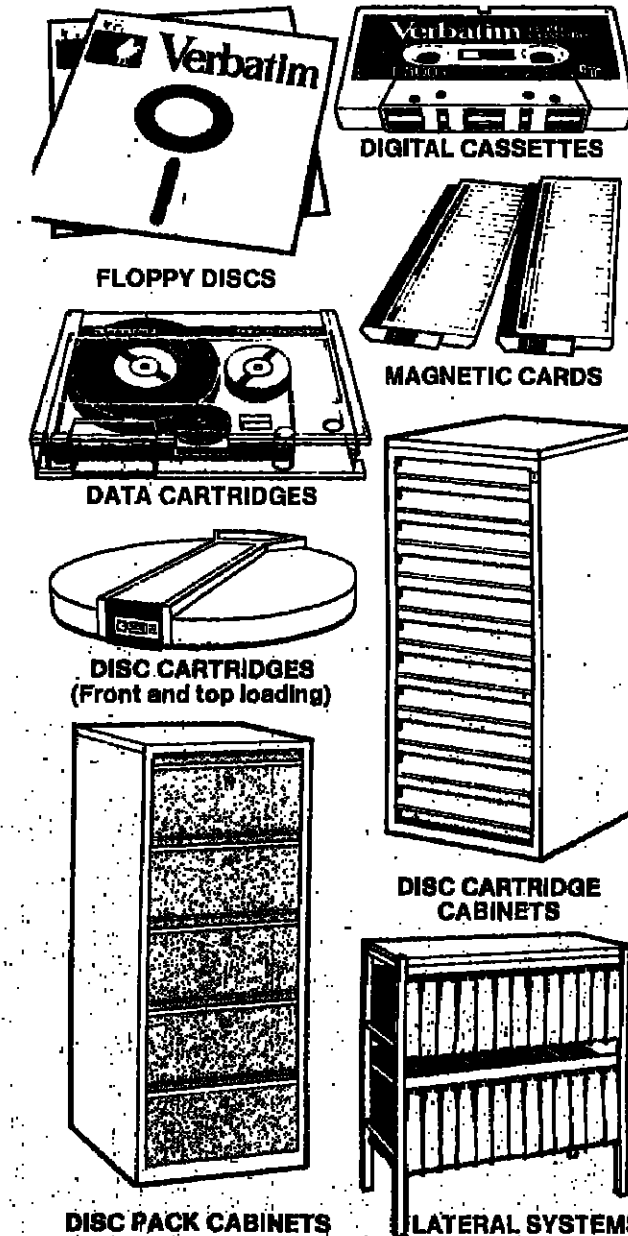
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SERVICES industry 17% growth

SALIS of computer services in the UK grew by 17% last year, with total turnover reaching \$6,900 million. This is revealed in ADAPSO's annual report on the services industry, compiled by Input, the market research firm.

Of the three segments of the industry given, bureaux earned \$5,200 million, software houses \$972 million, and consultants \$872 million. Banking and manufacturing were the industry's major customers, banking providing 17% of total revenues and manufacturing 21%.

The study also looked at the impact of minis and microcomputers on the services industry. It concluded that about 25% of existing services business, largely at bureaux, is vulnerable to replacement by in-house minis. However, the larger bureaux expect to gain business by installing minis and micros at their customers' premises. About 7,000 such installations are expected by 1979.

The report is available for sale by ADAPSO at \$495 a copy.

A young visitor has her fortune told by an MDS Series 21 Model 40 system at Regatta's Old English Fayre last week. The Series 21, operated by Action Research for the Crippled Child. The Fayre was organised by Regatta Round Table.

GEC pre-tax profits up 16%

PRE-TAX profits at GEC rose 16% to £325 million in the year to March 1978 on turnover up 14% to £2,343 million. The company did £608 million of business overseas, representing 26% of the total. The largest single sector is the one that groups together electronics, automation and telecommunications, which produced turnover of £672 million in the UK. GEC now has £617 million in net cash, but as this is in the UK it would probably have to arrange a loan for acquisitions in the US.

'Up to 20,000 Series 1 minis a year by 1981'

BY 1981, IBM's Series 1 minicomputer is predicted to bring the company annual business of \$14 million, and to represent one-fifth of the total business then done by the General Systems Division. GSD contained in a report on the Series 1 from International Data Corp, IDC.

IDC also predicts that IBM will be shipping over 10,000 Series 1 minis a year by 1980, and will be up to 20,000 a year by 1981, and contrasts this with minicomputer market leader Digital Equipment Corp.

According to IDC, DEC shipped 19,500 minis in 1976, after it had been in the business 11 years.

It also forecasts that IBM's share of the world minicomputer market will grow from 3% last year to 15% by 1981, but adds a word of cheer for the traditional minimakers: only 20% of the business will be at the expense of other manufacturers; the remainder will be from new markets developed by IBM.

A \$500 million market for independent suppliers making peripherals for Series 1 is forecast by 1980.

The report, apparently untitled, runs to 20 pages, and costs \$45 from IDC, 214 Third Avenue, Waltham, Massachusetts, MA 02154, US.

Search is on for the UK's 'export expert'

A COMPETITION to find Britain's 'Export Expert' is to be held by the Institute of Export, in conjunction with another organisation, the CBI and the TUC.

Men and women working in or studying for the export business will be asked a wide range of questions on matters relating to exporting, and the winner will receive a prize of £500.

This is a repeat of last year's 'Export Year Expert' competition, and is intended to demonstrate the wide range of knowledge needed to compete in tough international markets: salesmanship is no longer enough.

Contestants will be quizzed on documentation, insurance, transportation, finance, etc, as well as general knowledge.

Each winner of the five regional heats of the competition will receive £100 and go on to the national final. Last year's winner, Brian Moran of Rexel, will be defending his title.

Those interested in competing should contact James Robinson at the Institute of Export, World Trade Centre, London E1. Tel: 01-488 4766.

Analysis of European electronics manufacturers

FINANCIAL details of the 50 biggest electronics manufacturers operating in Europe are provided in a yearbook now available from Mackintosh Publications Ltd. The companies listed sell all kinds of electronic equipment, including computer systems, test process and electronic calculators and cash registers. The other product areas include communications equipment, consumer electronics and components.

For each company the yearbook lists its sales by product, by area and by subsidiary companies, where they exist. Profit and asset figures are also provided and in most cases figures are presented for each year going back to up to 10 years. In each case the latest figures relate to 1976.

The biggest electronic supplier in Europe in 1976 was IBM, with sales worth more than \$7,400 million, while Philips followed fairly closely with \$6,500 million, although computer equipment accounted for only a small percentage of this.

Of the total sales of electronic equipment in Europe in 1976 of \$50,000 million, US based firms accounted for \$16,000 million, West German based companies for more than \$9,000 million, and UK and French firms for about \$5,000 million each.

Mackintosh Yearbook of European Electronics Companies 1976, 618 100pp, Mackintosh Publications Ltd, Mackintosh House, Napier Road, Luton, England, LU1 1RG. Tel: Luton (0582) 417438.

NEWS IN BRIEF

Little to fear - police chief

THE public have little to fear from the use of computers by the British police, according to Sir David McNea, Commissioner of the Metropolitan Police. But, he told a GSA lunch, clear and adequate safeguards are needed against the misuse of computerised information.

However, if general access were allowed to police records would greatly inhibit police work, he said, adding that he thought most people 'are not very concerned' about being able to inspect records.

Anti-trust limits

A US government commission studying ways in which anti-trust cases such as the nine-year-old case against IBM can be speeded up, has been advised to recommend that strict limits be set on the pre-trial period for assembly of evidence, with penalties for lawyers who dilatory tactics or file frivolous motions.

Zilog launch

A MICROCOMPUTER system that can be used as either an intelligent terminal or as a general computer system has been introduced by Zilog. Known as the MCZ 1700, it is based on a dual 280 microprocessor board configuration.

Certificate record

A RECORD number of students, 806, have gained the National Computing Centre's Basic Certificate in Systems Analysis. Design this year 'Of the year' were overseas.

EEO directive

COMPUTERS are free from EEO trade directives until 1981, a recent report a printer's union added six years on to the ban on racial discrimination.

MICRO NEWS

'Bleak future' for micro applications

AT the same time that two of the three working parties set up by the Advisory Council for Applied Research and Development to look into the impact of the microprocessor on British industry, have completed their reports, a chilling indictment of the industry's capability to use the device has come from Sussex University's Science Policy Research Unit.

In a report called 'The impact of microelectronics in the UK: A suggested classification and illustrative case studies', the SPRU points to a potentially bleak future.

The Sussex report refers to what it calls a 'dynamic failure mode' in those areas of British industry that are already under the threat of foreign imports that either use micros, or employ them in the manufacturing process. The dynamic failure mode is one in which only the successful companies can afford the high costs involved in developing new products and production processes. The less successful companies are left to become progressively less successful.

The report also highlights the underlying theme behind the Department of Industry's efforts to generate a strong UK microelectronics industry, and the National Economic Development Office's insistence that support for it should cover potential standard products, as well as specials.

It states that even where firms do respond to the challenge presented by the microprocessor and microelectronics, the overall economic prospects could still be bleak. In the absence of

an established British microelectronics industry, the firms will have to import many of their components, the report states, suggesting that the balance of payments in new technology is likely to be severely negative.

Only one area of industrial activity, office products manufacture, comes through relatively unscathed from the four main sectors that are examined in the report. Yet even here, in an area where microelectronic technology is rapidly being exploited, the counterargument of the adverse effect on employment prospects is raised.

The report tends to underline the importance of the studies just completed by the ACARD working parties.

Now operating under the auspices of the government's Central Policy Review Staff, the 'think tank,' their reports will form the basis of future government policy towards the micro and its implementation.

The two completed reports cover the immediate aspects of the impact of solid state technology on industry, and the ways in which new companies can be established to exploit the new technology more easily.

The former has helped formulate the policy taken by the Department of Industry in its announced support for micro applications (CW, July 6).

The DoI suggested that only 50% of UK industry knew about micros, and only 2% of that figure were actually doing anything about it. The report is certain to call for support along the lines set out by the DoI, but

Bywood gives details of Scrumpi 4 kit

MORE details have come from Bywood concerning its soon to be announced Scrumpi 4 microcomputer kit, first mentioned publicly by the company at the Do-it-Yourself Computer Show.

As indicated, the system should be one of the first kits available that makes use of a large capacity ROM to hold the Basic Interpreter software. This is a 32K bit device from National Semiconductor that is masked with the company's NIBL, National Industrial Basic Language. This is a 4K byte tiny Basic that requires a minimum of 1K byte of addressable memory for operation.

Like the other Scrumpi kits, number 4 is based on the National Semiconductor SC/MP-2 microprocessor, and in minimum configuration will be equipped with the 1K byte of RAM required by the software.

It will, however, be socketed to accommodate up to 14 devices of the 2114 type, giving a total capacity of 3K bytes of RAM, plus an additional eight sockets for either 2708/2716 type ROM/PROM devices, or RAMs with similar pin out configurations, which takes the total RAM capacity up to 16K bytes.

Additional sockets for further ROMs are also included. In particular, there is a socket for the new National Semiconductor 64K bit ROM announced earlier this year and due to be available before the year is out.

1800% growth at Crellon

THE expansion of the market for applications of the microprocessor is such that Crellon Microsystems, a division of component distributor Crellon Electronics, expects its second year turnover to grow by a colossal 1800% over the \$55,000 achieved in its first year of operation, but its turnover predictions for the following year are more modest at 50 to 100%.

According to David Jackson, the division's technical manager, this growth rate is based largely on the decision by the distributor company to establish what he called a 'proper' support program for industrial companies that lacked the technology and expertise to apply microprocessors to their products.

The division now offers subcontract systems development service that is currently based on the micros that the distributor company is franchised to sell.

The immediate basis for the division's growth predictions stem from a \$800,000 contract received from an Australian company, plus the possibility of a large Ministry of Defence order for a data logging system.

Although currently geared to work with the devices its parent company sells, and with some \$80,000 worth of suitable development systems already installed, the division is now planning to expand its operations beyond these franchised products. It is currently looking at both the Tektronix and Futurdata development systems.

probably at greatly increased levels.

The importance of the second report is of greater potential, for the expertise to develop microprocessor applications economically is probably available in the UK, if the right circumstances can be established to promote and exploit it.

These two reports will now be studied by the full Council and government ministers, together with the third working party of the ACARD trio. This has the task of examining the long term social and economic implications of the growth of microelectronics exploitation.

It seems certain that it will take the view that UK industry must make the opportunities presented by the micro, for the threat to industry from more advanced competitors will be there anyway.

Service company for kits

THE growth in the number of microcomputer kits has prompted the formation of a new company, Video Terminals, that intends to service the market's need for power supplies and video monitors.

Based at 197, Hornbeams, Hurlow, Essex, the company's first product is a combined power supply and video monitor that will be available in either kit form, or pre-assembled. Although aimed initially at the large number of Nascom 1 users, the kit will operate with most systems currently available.

Two versions of the system will be produced, each of which will have a nine-inch display tube. One supplies 1.2 amps at 5 volts, the other 4 amps at 5 volts.

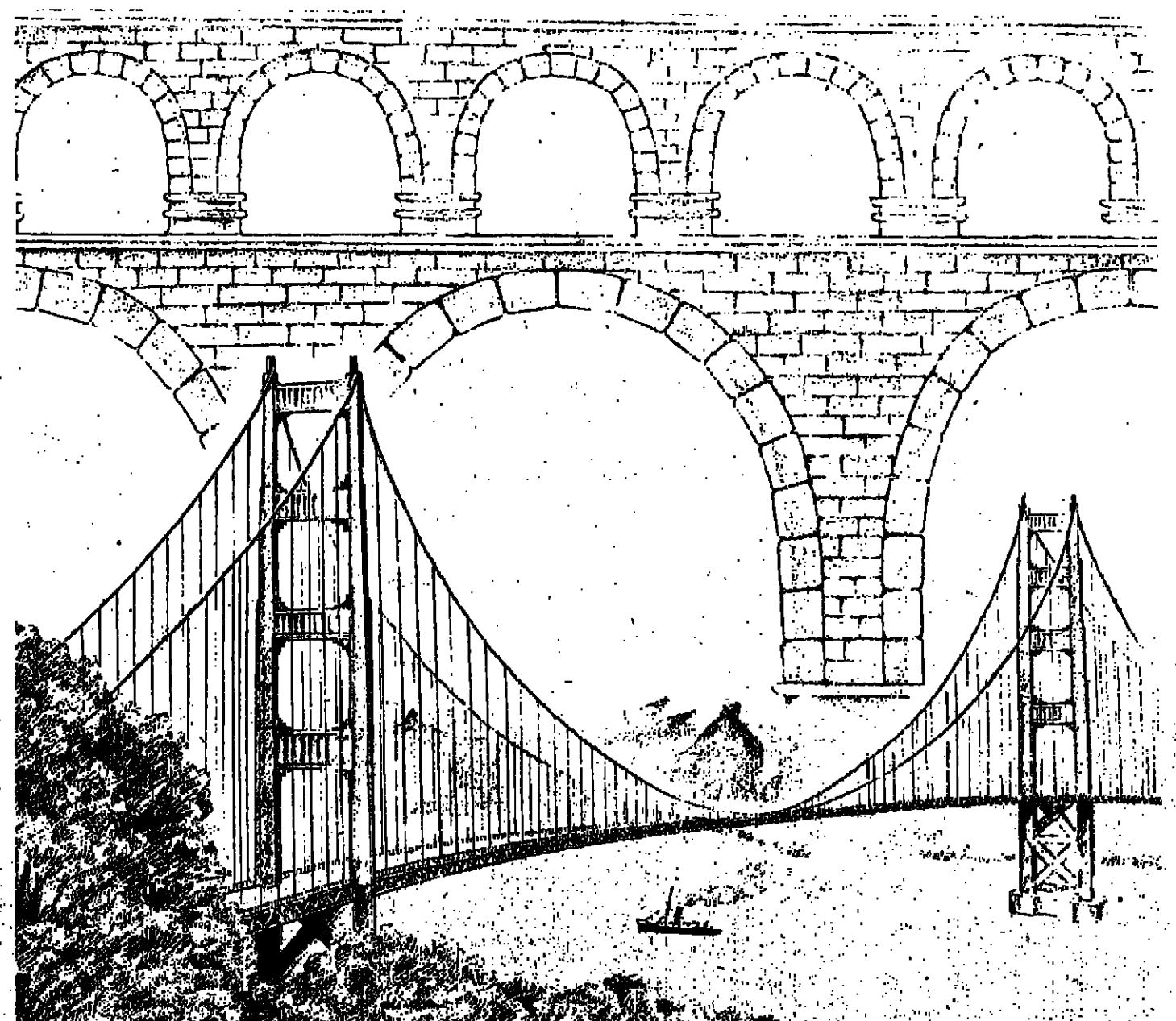
In kit form, the former will cost £168 and £185 pre-assembled, while the latter will be priced at £176 in kit form, and £193 pre-assembled.



The recent computer Othello competition which was sponsored by consultants Zeus Hermes and Computer Weekly brought out a variety of systems, and our picture shows Zeus Hermes managing director, Mick Punter, playing one of the smallest.

This is the version being sold by Mine of Information of St Albans to run on the Nascom 1 microcomputer kit. Available in cassette form, with documentation, for an all-inclusive price of £2, the package provides a full 8 by 8 matrix display. White places are represented by an open square, while black places are shown as hatched squares. A comma indicates an empty square into which it is possible to move.

The program automatically detects the end of the game, but leaves the two players to count their own places to see who has won.



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The above locations indicate a selection of our clients with current vacancies for either potential or experienced writers; the salaries stated are definitely on offer for candidates who meet the requirement. In some cases the client concerned is in the process of setting up a technical publications team. In most cases either complete or very generous relocation expenses can be negotiated. We welcome calls from anyone now engaged in documentation or interested in making a career change into this creative, interesting and financially rewarding work. We have many other clients in other UK locations and overseas.

Marketing Support Analysts

West London up to £7,000 + car
This company are seeking self-motivated analysts, ideally from a communications systems environment, who would like to apply their talents to marketing a first class product and offer pre/post sales support. Applicants will be readily considered who have a fairly broad knowledge of the d.p. industry, particularly the terminal systems market, some background in technical programming and analysis is a definite bonus. The company will offer a generous salary commensurate with experience, a private company car (including private mileage) and a definite career path.

Programmer/Analysts

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Our client is an international company setting-up a distributed-processing system from scratch. They have tremendous resources and are prepared to pay up-market rates for the expertise needed - it will, however, be a fairly small but highly industrious team, which indicates the kind of autonomous responsibility you could be seeking. Applicants should have at least 2 years solid experience of programming with recent additional involvement in analysis. Particularly attractive will be teleprocessing, commercial, or transaction processing experience on minicomputer systems.

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For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

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The contract is for a minimum of twelve months and includes free accommodation, use of a car and two free holiday trips to Malta.

COBOL Programmers

Surrey Start to £6,900 + BUPA
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Their Richmond headquarters services both Europe and UK, so after initial training you could find yourself spending short periods abroad - supported by generous Tax-Free Allowances on top of your salary. If you enjoy programming, would welcome the chance of travel and variety, and relish the idea of keeping constantly in touch with modern equipment and ideas, you may fit into this challenging and exciting environment. First class training and promotion opportunities, relocation expenses and free life and health insurance are some of the substantial benefits available with this company.

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Ref: W2/2007

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(Ref 17A)

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(Ref 17B)

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(Ref 17C)

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(Ref 17D)

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Reference JC29/1

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Reference JC29/3

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Reference JC29/4

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Reference PG29/6

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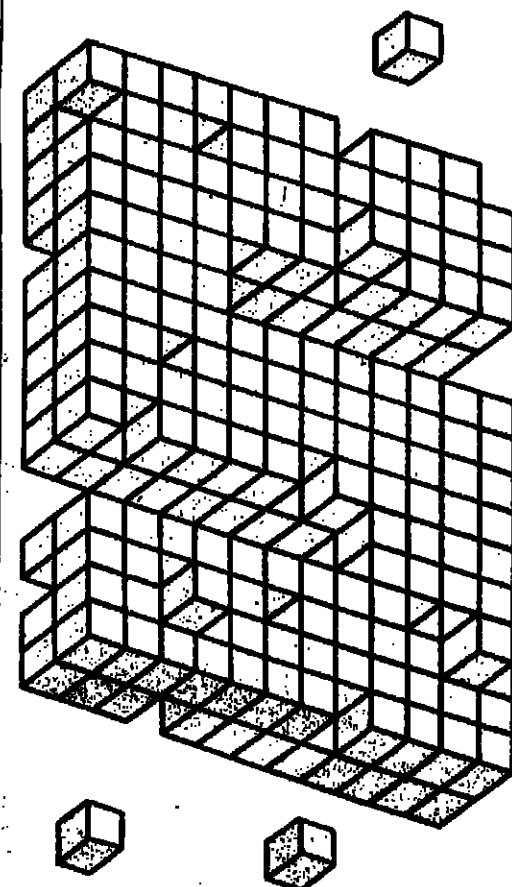
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Which direction at the very least, whilst working for this international corporation you will be expected to give directional advice and practical involvement for their customers whether they are multi-million £ companies or smaller, more cost conscious users with important computerised problems to be solved.

You will be able to show real experience in at least 2 of the following:

- ★ Business Consultancy
- ★ Data Base Techniques
- ★ Project Management
- ★ DP Management
- ★ Commercial Systems Design
- ★ Communications Design

As a **Consultant** you will have a professional approach to match that of this Software Service Corporation. You will preferably be mobile, able to stimulate and motivate others and have skills of communication.

SALARIES RANGE FROM £6800-£8800 with other financial benefits.

LONDON AREA.

Please ring Doug Woodward, ref. 1406, tel. 01-235 3215.

CAREER-MINDED PROGRAMMERS

SAL. TO £6050. HERTS/ESSEX BORDER

Programmers with an ICL background are required to join a very professional International Corporation situated on the border of Herts and Essex.

They are searching for a Programmer and a Senior Programmer with 18 months' and 3 years' experience respectively, to work on a wide and challenging range of applications development. You will have some experience of either COBOL or PL/1 preferably gained in a George 2 environment, any knowledge, or exposure to DATADrive or similar packages would be advantageous.

Training is given as a priority and this provides the opportunity to gain tremendous expertise whilst working within a friendly team structure.

Please ring Doug Woodward, ref. 1183, tel. 01-235 3215.

BE A 2-SHIFT SHIFT LEADER

In East London on IBM DOS installation a shift leader with 4 years' experience under DOS to lead a medium sized team.

Salaries range to £4750. Please ring Glenn Donnelly, ref. 1053, tel. 01-235 3215.

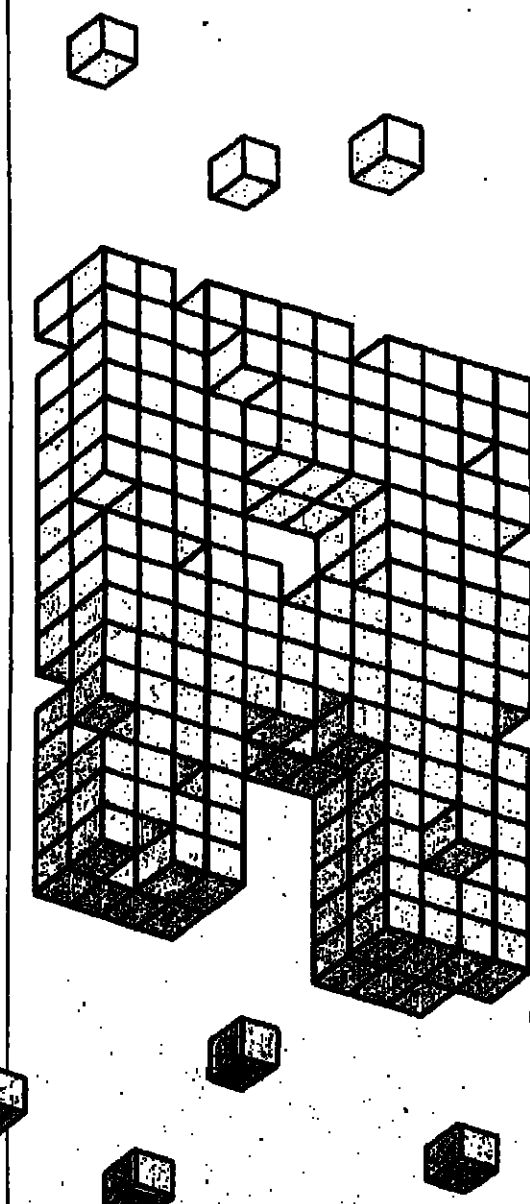
SHIFT LEADERS RELOCATE TO THE SOUTH COAST

3-4 years' experience on Medium range IBM 370 required with knowledge of OS/VS 1.

You should have the ability to progress into Management, and preferably aged 25-32.

Generous relocation expenses will be paid and in addition to a salary of £5K there are other lucrative benefits.

Please ring Glenn Donnelly, ref. 1396, tel. 01-235 3215.

**SUPERIOR SENIOR OPERATORS**

£4800 HERTS

We are looking for 2x Senior Operators of exceptional quality for our clients based in Hertfordshire. You will have at least two years' IBM/OS/VS 1 experience and be capable of coping with all day-to-day functions. With an eye to the future, this **TWO SHIFT** installation can offer you all the opportunities you are seeking.

Please ring Glenn Donnelly, ref. 1347, tel. 01-235 3215.

CONTRACT ANALYSTS and PROGRAMMERS

We have a continuous requirement for high calibre contract staff to work for our clients throughout the UK.

Each week we are inundated with new contracts so, whether you have IBM, ICL, HONEYWELL or MINI Computer experience with any types of SOFTWARE BIAS or LANGUAGE experience, we want to hear from You.

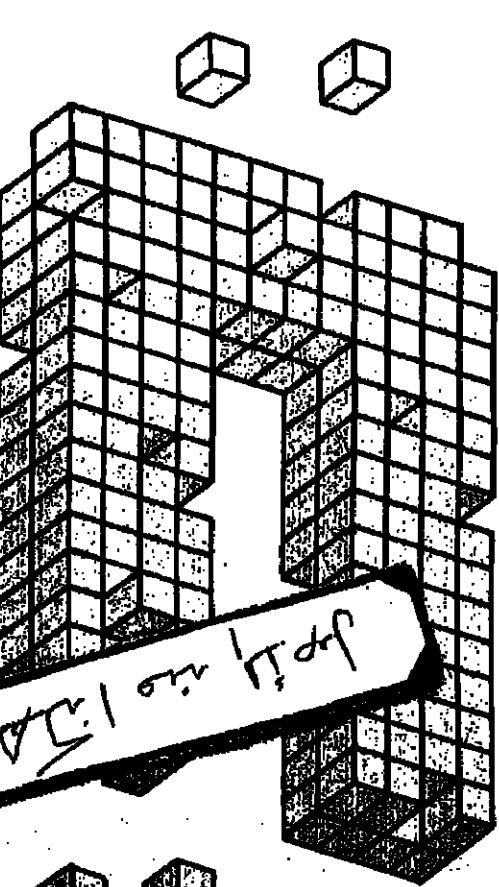
We give TAX ADVICE, offer CONTINUITY of EMPLOYMENT, pay EXCELLENT RATES PROMPTLY and will endeavour to give you the service you expect.

Ring Warwick Bergin, tel. 01-235 4931.

PROFESSIONAL CONTRACT OPERATORS

We have numerous posts available for Contract Operators and shift leaders. We pay excellent rates promptly and give a first class service to both our clients and our contractors.

Please ring Glenn Donnelly, tel. 01-235 3215.

**JUNIOR PROGRAMMERS**

LONDON AREA

Have you 6 months' - 18 months' experience in DP and already feel stifled within your present environment? If so perhaps NOW is the time for change. We have several clients who are prepared to invest their money in training you.

All you have to bring along is your own initiative and thirst for knowledge and they will guide you along the correct path.

Salaries for 12 months' experience are £4200.

Please ring Angela Walsh, tel. 01-235 3215.

SPAN COMPUTER PERSONNEL

Permanent Division 01-235 3215
Contracts Division 01-235 4931

2 Hobart Place, London, SW1

★ JOB SATISFACTION

PROGRAMMERS

MIDDLE EAST
We would like to meet computer professionals on behalf of our client with around 4 years' ICL 1900/2900 G3 COBOL/PLAN experience to discuss long and short term assignments in the GULF area of the Middle East.
* Scope in a variety of areas
* Conversion plans
* Accommodation and expenses paid by company
* Renewable assignments
* Salary c£12,000 TAX FREE

REF. 1598

★ SALARY

PROJECT LEADERS CITY

An outstanding opportunity exists within international finance group for 2 project leaders with experience at that level on ANY hardware, preferably in financial or insurance areas. Ideal candidate will have dynamic personality, confidence and self-motivation, be able to liaise at all levels and responsibility to act on own decisions.
* Security in a growing organisation
* Mortgage assistance/STLS/Non-contributory pension
* 5 weeks' holidays/sub restaurant
* OPPORTUNITY TO TRAVEL ABROAD
* Salary £7K

REF. 1848

★ CAREER OPPORTUNITY

MINI PROGRAMMERS

LONDON
Prestige company operating on a global scale are recruiting persons with 1-3 years' experience on ANY MINI ASSEMBLER to work in their new modern City offices. Having large DEC PDP11 equipment and expanding at a rapid rate they have a wide range of on-going projects both in hardware and software areas.
* Extensive training in up-to-date technology
* Excellent career opportunities
* Training in RSXII, RTII and RSTS
* Opportunity for future travel
* Salary £6,500c

REF. 1478

PL/I PROGRAMMER

LONDON
Why travel to London when opportunities exist? PL/I programmers, this well-known company with large IBM 370 equipment, offer you:
* Security in a very well-established and long organised D.P. division
* Training in IMS
* Prospects for systems
* Salary £5,000

REF. 121

SENIOR ANALYST MIDD.

Our client, a major organisation situated close to both M4 and M3 motorways, is seeking a Senior Analyst to act as PROJECT LEADER on a wide range of applications. If you have approximately 3 years' systems experience, preferably in ICL 1900 series environment and are able to demonstrate a professional approach to project management, apply NOW.
* Job security with a prestige concern
* Responsibility
* Excellent working condition
* FREE lunches, FREE Life Assurance
* Salary £8,500 + Company Car

REF. 1594

JUNIOR PROGRAMMERS LONDON

Multi-national company retaining large IBM 370 hardware requires programmers with at least 12 MONTHS' ASSEMBLER experience to join highly professional team. They are currently developing a major or sophisticated on-line system.
* Highly progressive organisation
* Continued development with a well-planned schedule
* Good promotional prospects
* Excellent benefits including cheap travel
* Salary to £8,000

REF. 1290

SALES PERSONS

ALL AREAS U.K.
Major world-wide organisation seeks enthusiastic self-motivated persons with proven record in sales; previous experience with computer or business machine manufacturer an advantage. Successful applicant will be selling variety of hardware or related software to industry, commerce and local authorities. Expected earnings well into five figures. Excellent career prospects and attractive fringe benefits.

REF. 1838

SYSTEMS ANALYST

HAMPSHIRE
Beautiful countryside surrounds this well-established NCR installation based near to the NEW FOREST and South Coast. Min. 2 years' experience in commercial or industrial systems preferably with NCR Century and Next 3.
* Currently setting up strong team to develop existing on-line systems
* Introducing T.P. and Database modelling in marketing, distribution and finance
* Discount on Company cars
* Subsidised lunch, sports/social club, pension scheme
* Salary £5,250 + Xmas bonus

REF. 1472

MINI PROGRAMMERS

HOLLAND & BELGIUM
We would like to hear from programmers on behalf of our clients with good MINI experience. If you have had at least 2 years' experience of ASSEMBLER on any MINI computer contact us IMMEDIATELY to discuss on-going projects in the above countries.
* Accommodation and expenses paid by company
* Renewable assignments
* Excellent scope in a variety of areas
* Salary—The sky's the limit. A.A.E.

REF. 1803

ICL PROGRAMMERS

LONDON
Due to development of their advanced computer systems, successful D.P. Services dept. seeks to build up programming team. Retaining large ICL 1900 equipment they offer excellent opportunities for persons with minimum 2 years' ICL COBOL & PLAN experience.
* Training on ICLMS Database
* Development to analysts
* Opportunities to join at senior level
* Applications in various areas providing an absorbing and interesting career
* Excellent perks include flexible working hours and 6 weeks' HOLIDAYS
* Salary £5,500

REF. 1549

SYSTEMS ANALYST PROJECT LEADER DESIGNATE

ESSEX
International company engaged in manufacturing, distribution and sales of well-known commercial products, seeks person with design and implementation of either stock control order systems in an IBM environment. He or she should have the potential to control Project team developing one or more of the above systems.
* Excellent working environment
* Paid overtime
* Flexible hours, 4 weeks' holidays
* Company expansion with additional hardware
* Distributed processing
* Salary c£9,500+

REF. 1827

PL/I PROGRAMMERS

W. LONDON AND
As part of a prestige international group of companies, our client is now recruiting programmers with minimum 2 years' PL/I experience with Assembler an asset for the design of manufacturing systems on the IBM series 1 mini computer.
* Excellent opportunity to be trained on IBM computer
* Versatility of IBM series 1 — in relation to IBM mainframe
* Working with up-to-date technology
* Excellent career opportunities including chance of working with micro-computer

REF. 1581

SENIOR PROGRAMMER

Our client is a major supplier of construction materials throughout the U.K. with a turnover exceeding £200 million. They run a modern computer centre situated in the pleasant outskirts of Oxford and wish to appoint a senior programmer. The centre operates an ICL 1901T (upgrading shortly) under George II. Successful applicant will have comprehensive COBOL experience and a knowledge of PLAN and FILETAB would be an advantage. Candidates would be expected to work with minimum supervision on their own initiative. Co. offers

- * Relaxed picturesque surroundings, but not too far from the city of the gleaming spires — it should be pointed out that because of the rural location applicants should have their own transport.
- * Opportunity to work in small friendly department.
- * Salary to £5,500.

KNIGHT

PROGRAMMING SUPPORT LTD.
27 Noel Street, London, W.1
Tel. 01-734 0152/3010 (24 hrs.)



Management Consultant

Computers
West Yorkshire, to £8,000

Our client is a well established and respected firm of Chartered Accountants operating on a broad client base both nationally and internationally. The requirement is for a professional consultant to operate within the Management Advisory Services Division of the firm. Reporting to the Executive Director responsibility will be in two main areas: feasibility studies, selection and advice on the installation of mini-computers for clients, together with program implementation; file

Male or female candidates should telephone in confidence for a Personal History Form to: LEEDS: 0532-448661, Minerva House, 29 East Parade, LS1 5RX.

Hoggett Bowers
Executive Selection Consultants

BIRMINGHAM, CARDIFF, GLASGOW, LEEDS, LONDON, MANCHESTER, NEWCASTLE, and SHEFFIELD.

WORLD SHORTAGE OF PROGRAMMERS

We need several more programmers to help us keep our lead in the Word Processor market. We design and write assembly code programs for 8080 and Z-80 microprocessors. You can have any job title you like (except, perhaps, Director), provided you can write code and make it work.
Experience of microprocessors would be useful — but isn't essential. We prefer working with graduates — or at least people of an equivalent standard. The main qualification is, however, the ability to produce useful programs from a minimum of specification — after all, if we tell you exactly what to do we might as well write the code ourselves!
If you want to know more about working for this small company in sunny Dorking, then ring Chris on Dorking (0308) 87769.

DATA
RECALL LTD.
Sondes Place, Dorking, Surrey



JUNIOR PROGRAMMERS

c. £4000 p.a.

I.B.M. 370-138, DOS-VS, CICS, SPMOL

The Computer Services Department at The Royal Borough of Kensington and Chelsea was formed during 1977. An opportunity now exists for two Junior Programmers wishing to develop their programming careers in a progressive systems development environment, utilising the latest computer facilities and proven standards.
The Junior Programmers will be working in a project team environment, coding and testing programs in COBOL and possibly RPG II.

Applicants should have received basic training in programming and have gained at least 9 months' COBOL programming experience.

THE ROYAL BOROUGH OF KENSINGTON AND CHELSEA

Application form quoting Ref. CW/662 from the Establishment Office, Department 151, The Town Hall, Hornim Street, London W8 7NX. Tel. 01-837 8562 (24-hour answering service). Application form to be returned by 4th August, 1978.

SALES PERSON HOLLAND

As Europe's largest suppliers of contract computer personnel to Holland, we require an additional sales person for our Amsterdam office. The successful applicant will have good computer experience, preferably with a sales background. He or she will be self-motivated and keen to travel. Remuneration will include generous guaranteed basic income, and a substantial commission. We will expect a successful person to earn in the range £15-£25,000 p.a. A car will be supplied.

Please reply to

The Directors

KNIGHT
PROGRAMMING SUPPORT LTD.

27 Noel Street, London, W.1
Telephone: 01-734 0152 (24 hours)

LONDON BOROUGH OF BRENT SYSTEMS ANALYSTS

Free Local Authorities are offering attractive opportunities in Computer Development.
The London Borough of Brent wishes to appoint a Systems Analyst with responsibility for monitoring further opportunities for Computer Usage within the Department of Education and for monitoring existing problems and recommending solutions.
The successful candidate, male or female who will hold the position of Computer Development Officer, will have full project involvement from initiation of feasibility studies, to examination for commercial packages and implementation within program and systems.
N.B. Current installation consists of an IBM 370/145 located at Acton with 1000 and junior on direct line from Brent.
Starting Salary will range between £8,345 and £8,887 p.a. depending on age and experience. Enthusiasm and ability to handle a wide range of professional staff are essential qualifications.

Further details and application forms from the Administration Manager, Room 708, Brent House, High Road, Wembley Middlesex, returnable by 3 August, 1978. Telephone 01-923 0371 (24 hour Answerphone service). Please quote Reference Number 7/82/D.

HAVE YOU TRIED... CUTTING CORNERS?

I am a PROGRAMMER/ANALYST/OPERATOR

(Delete inapplicable)

looking for Employment in the

area

Name

Address

Home No.

Work No.

Ext.

Cut out and post to

D.P. RECRUITMENT LTD.

KENT HOUSE, 87 REGENT STREET, LONDON W1R 7HF
TEL: 01-437 2082/3/4 (24-HOUR ANSWERPHONE)



Compower

APL TIMESHARING SALES CONSULTANT

The company:

Compower Limited is one of the largest computer service organisations in Europe with a turnover in excess of £12 million p.a. It provides a wide range of services to its parent the National Coal Board and over 900 other customers through six linked computer centres situated in the main industrial regions of the U.K. The Headquarters is at Cannock, Staffordshire.

The Job:

The Sales Consultant will be a member of a specialist team, working in an expanding and highly successful environment, supported by the most powerful interactive service available in the country — Compower's Power-share service. He or she will market APL, Financial Planning and other time sharing services to Government, Local Authorities and Public and Private organisations throughout the U.K.

Requirements:

Applicants should be graduates and have some experience of using APL in a commercial environment or have experience in the application of interactive computer techniques to business problems.

Location:

At the Company Headquarters, Cannock, Staffordshire.

Salary:

c. £5,000

Pension, Holidays, etc.

The conditions of service and other benefits are those which might be expected of a modern progressive organisation.

Applications:

Brief details of career to date should be sent in the first instance to: Mr. E. W. S. Fatten, Staff Manager, Compower Limited, Cannock, Staffordshire

SIEMENS

TECHNICAL TRANSLATORS AND EDITORS

To work in MUNICH or SUNBURY-ON-THAMES

Here is an opportunity for technically minded linguists or linguistically talented communications engineers or DP specialists to join the Translation Department of SIEMENS AG, Munich or SIEMENS LTD., Sunbury.

You'll be joining an expanding section specialising in the translation of Switching System Documentation (Software and Hardware) and Operating Systems Software from German into English.

Linguistic expertise is more important than formal qualifications. Ideally you will be of English mother tongue with an excellent command of German.

There are also a number of openings for FREE-LANCE TRANSLATORS with similar qualifications and experience as well as TECHNICAL AUTHORS familiar with DP software but with a limited command of German.

Excellent remuneration and working conditions are offered. Address your application to:

SIEMENS AG
Hauptstelle für Übersetzungen, Hofmannstrasse 61
8000 München 70, W. Germany



Computing Services Association

OVERSEAS

MESSAGE SWITCHING BURROUGHS GEMCOS
FORTRAN POP
PDP FORTRAN IV RSXII
DOS CICS VS COBOL
BURROUGHS COBOL & DMS DATABASE
PL/I PROG LONG CONTRACT
HONEYWELL 6000 GCOS COBOL
FORTRAN ADV
PDP RSXII LONG CONTRACT

BELGIUM £450 p.w.
BELGIUM £450 p.w.
IRAN EXCELLENT
HOLLAND £400 p.w.
HOLLAND £400 p.w.
PARIS £400 p.w.

BELGIUM £ NEG + EXPENSES
GERMANY £ EXCELLENT

ANALYST PROG IMS COBOL
IMS COBOL PROG
IBM SYST 3 RPBI
PDP RSXII FORTRAN
PDP RSXII MACRO II
SNR ANALYST DATABASE DESIGN
ICL 2900 VMEB COBOL
BURROUGHS 6700 COBOL
ICL 1900 COBOL/BI
PDP MUMPS/BASIC OR ASSEMBLER
OL/I COBOL PROGRAMMER

BEDS. £230 p.w.
HERTS. £230 p.w.
ESSEX £200 p.w.
BERKS. £250 p.w.
HERTS. £240 p.w.
HERTS. £240 p.w.
BERKS. £200 p.w.
SURREY £200 p.w.
C. LONDON £200 p.w.
CRAWLEY £220 p.w.
KENT £250 p.w.

KNIGHT PROGRAMMING SUPPORT LIMITED

27 NOEL STREET, LONDON W.1 TELEPHONE: 01-734 0152/3 (24 HOURS)
OFFICES: AMSTERDAM, PARIS, MANCHESTER, BIRMINGHAM



Science Research Council
ROYAL GREENWICH OBSERVATORY
COMPUTER DEPT.

has vacancies for
PROGRAMMERS
Higher Scientific
Officer /
Scientific Officer

There are two vacancies for programmers in the Computer Department of the Royal Greenwich Observatory at Herstmonceux. The Department is responsible for the provision of the central computing services of the Observatory. An ICL 19031 computer system is used for batch and interactive data processing and an IBM 360/195 system for interactive graphics. A remote job entry terminal provides access to a powerful IBM 360/195 system at the Science Research Council's Rutherford Laboratory, near Oxford. The staff of the Department are responsible for development of applications programs as well as for the improvement of the systems software and user support.

Post 1 is for a Higher Scientific Officer to join a small group that is developing new methods for the interactive analysis of astronomical data in digital form, which will be produced by new instrumentation on large telescopes. It is expected that new facilities, including colour TV displays and possibly an array processor will be obtained in order to allow more sophisticated, and faster, processing. Applicants should have a good honours degree in physics, mathematics or other relevant subject, and at least two years post graduate study or experience of scientific data analysis using computers. Salary, starting between £4,101 and £4,579 according to experience, rising to £5,440.

Post 2 is for a Scientific Officer to work mainly in the programming group for the main computers on both systems and applications software, in collaboration with scientists and engineers of other departments. Current projects concern the provision of more powerful graphic output facilities, and the implementation of word processing and information retrieval systems. Applicants should have a degree, or equivalent qualification, in computer science or a related subject, and an interest in scientific applications of computers. Experience of Fortran and ICL 1900 computers would be an advantage, but further training will be given as necessary. Salary scale £2,839-£4,415. Starting salary according to qualifications and experience. Both posts are permanent and pensionable (non-contributory pension scheme).

Application forms and further information can be obtained from Mr. John Philcox, Royal Greenwich Observatory, Herstmonceux Castle, Hailsham, East Sussex BN27 1RP, telephone Herstmonceux (032-181) 3171 Extension 208 and should be returned not later than 11th August 1978.

DP Specialists...

Take a really hard look at our software

Our Electro-Optical Systems activities at Basildon have established us as one of the foremost authorities on the design, development and manufacture of advanced systems for a wide range of commercial and military applications. We produce specialised television and other viewing devices and make use of digital and RF techniques and highly sophisticated signal processing and transmission systems.

The applications for our equipment are many and varied covering ground-based, airborne, shipborne and underwater surveillance, guidance and tracking systems including those for the latest Sting Ray torpedo project. At the heart of many of these systems is a mini-computer or microprocessor and it is in this highly specialised area of data processing that we are looking for additional men and women to fill the following appointments:

Team Leader

This position in the Future Systems Laboratory is for a senior DP specialist to lead a team working on signal processing techniques. It calls for a degree in mathematics, physics or electronics engineering plus several years' experience of digital and analogue correlation techniques and some knowledge of statistical decision making. Experience of recursive filtering, fast Fourier transforms and state variable techniques are also desirable.

Computer Application Engineers

To work on trials analysis. Essential requirements are a degree in physics, electronics or computing science; experience in the use of computers in an overall system and software design. It would also be an advantage to have experience in analogue and digital circuit design, software design for mini-computers or microprocessors and underwater signal processing.

Programmers & Electronic Designers

To work on conditioning chamber control and automatic test equipment using a PDP 11 computer. Other work will cover project control, line of balance and other related activities. Essential requirements are qualifications to at least HNC level with experience of FORTRAN/Assembler languages and mini-computer and microprocessor work. Experience in business administration would also be useful.

Computer Operator/Programmer

To operate a visual display unit for printed circuit board design and other tasks. It will involve maintaining close liaison with engineers to obtain data for the running of programs; assisting on program coding and maintaining records. A good technical background is essential together with experience in the use of computers.

Our work offers a stimulating and challenging opportunity to those with the ability to involve themselves wholeheartedly with our projects, and future career progress can be rapid if you have the necessary skills and potential to take responsibility.

Salaries are highly competitive and the benefits generous, including assistance with relocation where appropriate.

Write with details of your experience stating the position of interest to J. S. Nealon at Marconi Avionics Limited, Christopher Martin Road, Basildon, Essex. Telephone: Basildon (0268) 22822 ext. 86.

MARCONI
AVIONICS
A GEC-Marconi Electronics Company



NALGO Requires: DEVELOPMENT OFFICER

Salary £5,787-£8,361 p.a. (under review). Applicants should have two years' in-depth system analysis experience and ability to communicate effectively with user departments. Must be self motivated.

2 PROGRAMMERS

Salary £4,780-£5,050 p.a. (under review). Applicants should have two years' Cobol experience on ICL 1900/2903.

To work on ICL 2904 (40K, Tapes, EDS 80's, and D.D.E.'s). Applications include financial, insurance and assurance, building society, salaries, wages, etc.

Minimum of 26 and 23 days annual leave respectively for these posts and additional leave at public holidays. Rental mortgage interest rebate. Contributory pension scheme. Staff restaurant. Salary increases operative from 1st July, 1978 are currently being negotiated.

Requests for application forms and further information should be sent to:

The General Secretary, National and Local Government Officers' Association, 1 Mabledon Place, London WC1H 8AJ.

Closing date 4th August, 1978.

SOUTH-WEST UNIVERSITIES REGIONAL COMPUTER CENTRE UNIVERSITY OF BATH ICL 2980 OPERATING

The Regional Centre operates a large 2980 system under VM/C/B, providing computer services to Universities in the South-West via powerful communications facilities.

Applications are invited for the post of:

SENIOR OPERATOR

The post offers excellent opportunities for career advancement with ICL, new rates. Candidates should possess initiative, technical ability, plus an understanding of operating.

Salary £5,281-£5,444 + 2 Shift Allowance of £375 (under review).

Application forms and further particulars (including Ref. 78/11) from: Regional Officer, University of Bath, Mabledon Place, London WC1H 8AJ. Closing date: 20th July 1978.

SPEND 12-18 MONTHS IN THE USA RETURN TO A CAREER POSITION IN THE UK ANALYSTS & PROGRAMMERS

All 3rd generation hardware backgrounds considered. Openings at all levels. OPPORTUNITY TO GAIN 370 TRAINING AND EXPERIENCE; ON AN EXCITING 1-2 YEAR VISIT TO AMERICA.

Join INFORMATICS INC., a prestigious world-wide consulting company. Initial assignments will be in the US as part of our program of Orientation, Training and On-the-Job experience; to develop your technical and management skills for your return to our British operation. We have recently opened a London office and have opportunity upon your return.

EXCELLENT SALARIES & GENEROUS RELOCATION ALLOWANCE INCLUDING FULLY PAID RETURN FARE EXPENSE PAID INTERVIEWS

LONDON: JULY 27th
To arrange a confidential interview send resume immediately, or phone our UK representative, L. Levine, beginning Monday, July 24th (reverse charges accepted).
L. Levine, Royal Lancaster Hotel, Lancaster Terrace, London W2
2TY: 01-262 6737

COMPUTER PROGRAMMER

Bostrom Division of UOP Limited is the world's leading manufacturer of suspension seating for the truck, tractor and industrial equipment markets.

We are currently seeking an experienced programmer to join our small, but expanding D.P. installation, which utilises an IBM System 3 Model 12.

The successful applicant will have a minimum of two years' programming experience, using RPG II, and will probably have worked in a manufacturing environment.

Commencing salary will be dependent upon age and experience, and the company offers a wide range of benefits, including 28 days' annual holiday and contributory pension scheme with free life assurance benefit.

Please write or telephone for an application form to Mrs. P. Cowgill at the address below:

UOP
Bostrom Division
UOP Ltd.
Weydon Road Industrial Estate
Loughborough, Leics. LE11 1BB
Telephone: (0504) 55521

MANAGEMENT & EXECUTIVE SELECTION

COMPUTER WEEKLY, July 20, 1978

telephone 01-637 9611

SOFTWARE PROGRAMMERS

Lead the field with the manufacturers!

Do YOU have a good background in assembler, machine code, or specific high level languages on mainframe or minis? Any assembler would be useful and if you have already worked on Software Development so much the better. Are you also outgoing, confident and ambitious because there are other openings in sales support roles for you. These positions should all have been filled yesterday — so phone me today.

DORSET

Fortran, Macro, Coral useful

to £6K

HERTFORDSHIRE

Coral or Assembler for Exec & Telecomms

to £7K

SURREY

Basic, Assembler, Fortran for mini and micro

to £7K

BERKSHIRE

Coral, Algol for Real-Time. Relocation paid

to £6½K

LONDON, NORTHANTS, BIRMINGHAM

Assembler, Cobol, Fortran, Coral

£neg

Contact Derek Pearson

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611

MANAGEMENT & EXECUTIVE SELECTION

COMPUTER ENGINEERS

Strike while the iron's hot!

Despite many successful placements I still have many vacancies for engineers all over the country. Mini/mainframe/peripheral/comms. engineers, either trainee or experienced, are needed by my clients for field service or site work.

The list below must be brief, so ring me today and find out the full story!

MIDLANDS/SOUTHAMPTON/NEWCASTLE/LONDON

Field Service — Mini and up to £6K package + car
Peripheral

LONDON

Site — Comms up to £7K package
Field Service — Mini trainee up to £5K package + car
Field Service — Peripheral up to £9K package + car

BRISTOL/MIDDX/LONDON

up to £12K package + car
F. S. & Site — IBM 370 series

HERTS

Design Engineers Micros up to £6½K (car neg)

For a service you can recommend — contact Peter Gorton.

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

SYSTEMS ANALYST

TUNBRIDGE WELLS

£5,800

We wish to appoint a Systems Analyst to join the active data processing department of our Client, located in this very pleasant area of Kent.

The successful applicant will become involved with a variety of projects which are planned for development and will also carry out investigations into new areas of computerisation.

Candidates should offer a sound background in computing, ideally they will have some practical programming experience and will have completed a project from feasibility through to implementation.

The Company are able to offer an attractive financial package plus the benefits associated with a large organisation.

Ref. E1/2007

SLOUGH

To £5,250

Our Client, a busy engineering company, is currently developing several on-line real-time applications.

If you would like:

- * To receive training in advanced IBM software.
- * Develop COBOL programs involving database and TP systems
- * Work on a variety of applications projects
- * Five weeks' holiday a year
- * Excellent starting salary and conditions of employment
- * To join an active sports and social club

— and you have a minimum of 12 months' COBOL programming experience, then this could be a good opportunity to accelerate your career.

Ref. W3/2007

1 YEAR COBOL?

BEDFORDSHIRE

£4,500

Our Client, a highly successful Company enjoying an upward trend in trading, is seeking to invest in more top class programmers.

The Company have established a good Data Processing Department and now wish to expand the systems development and so provide a total information centre for the user departments. It is planned that this will shortly relate to on-line systems.

Programmers with at least one year's commercial experience using COBOL and wishing to join a team working in this rapidly expanding environment are invited to apply.

With housing being both plentiful and realistically priced, this is an ideal opportunity for the career minded person to establish himself with a Company which offers good career progression opportunities and a comprehensive relocation package.

Ref. W1/2007

PROGRAMMERS to PROJECT LEADERS WEST LONDON

£4,000-£7,500

A computer bureau can provide excellent opportunities for enthusiastic development staff to work on a wide variety of computer applications and hence gain valuable experience over a broad spectrum of the industry.

Our Client is a successful organisation who are planning to expand considerably during the next twelve months. Therefore, they are currently seeking additional analysts and programmers to assume roles at all levels in a project team; and work on the development of new packages and tailor-made systems, employing both batch and on-line real-time processing. Successful applicants will be able to offer sound COBOL experience; and at the more senior levels varying degrees of analysis involvement.

The starting salary will be enhanced by a comprehensive range of fringe benefits and candidates can look forward to a progressive and exciting future.

Ref. W4/2007

24-hour answering service
Please telephone for a confidential
discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 0981

Just as I did

UNIVERSITY OF LONDON COMPUTER CENTRE

The University of London Computer Centre provides a regional computer service to the University of London and to Universities in the South East and South West of England. The Centre is equipped with Control Data 7600, 6400 and CYBER 72 computers, and supports a large communications network of over 50 remote batch terminals and 30 keyboard terminals.

TELECOMMUNICATIONS

A Senior Analyst/Programmer

is required to join a team engaged in the design, development and maintenance of telecommunications systems on mainframes and minicomputers. An existing programme of development is planned which includes a major commitment to networking and new protocols.

Applicants should be educated to degree standard and have several years of experience in assembly language programming and telecommunications software.

SYSTEMS

Two Programmer/Analysts

are required to join the operating systems team which is responsible for the development and maintenance of the SCOPE 2.1.4 and NOS/BE operating systems.

The work is challenging and involves evaluations and implementation of performance and other service improvements. The Centre is preparing plans for upgrading of its equipment; candidates will be expected to participate in any development.

One of these appointments will be made at a senior level and candidates for this post will be expected to have substantial experience in systems programming on a variety of equipment. Candidates with less experience are also invited to apply.

Candidates for both posts should be educated to degree level.

Salary will depend on qualifications, experience and age, and will be on a scale up to £758 inclusive of London Allowance.

Holidays 5 weeks per year plus Bank Holidays and 5 extra days.

Modern offices conveniently located for London Transport Services and Main Line Stations. Loans made to purchase Annual Season Tickets.

Further details and application forms are available by phoning Veronica Minors on 01-405 8400, extension 230, or by writing to the Secretary, ULCC, 20 Guilford Street, London WC1.

Closing date for completed application forms 7th August, 1978.

Senior Analyst

Applications are invited for the post of Senior Analyst in the Computing Services Department. The successful candidate will be responsible for the systems required by the Administration (e.g. Student Records system).

The Polytechnic has recently installed a DEC-20 to replace a 1905E and the Administration programs are currently being converted.

This post will require a good working knowledge of COBOL, preferably gained on DEC-20 or DEC-10 systems. However, knowledge of ICL 1905 COBOL or RPS2 would also be an advantage. It is unlikely that an applicant who has worked for less than three years with COBOL would be considered sufficiently qualified.

Salary: AP5 - £4481-£4781 plus supplement of £312 p.a.

Further details and form of application available from the Assistant Director and Chief Administrative Officer, Trent Polytechnic, Burton Street, Nottingham. Closing date 2nd August, 1978.

TRENT POLYTECHNIC NOTTINGHAM

SCOTTISH SOUTH-WESTERN HEALTH BOARDS

INTERMEDIATE PROGRAMMER

(£4,421-£5,326)

Applications are invited for the above post based in Glasgow, Paisley, and Ayr. The successful candidate will be responsible for the design, development and maintenance of computer programs for the Health Boards. The system provides a wide range of financial services and an integrated set of information. Services Division processes a wide range of information for Health Care, Planning and Management.

Applicants must have at least 2 years' experience of 1905 Cobol and be familiar with the use of ICL 1905 Software and George P-4 or George P-5.

Knowledge of communications programming and use of I.C.S. Communications Manager would be an advantage.

Salaries and further details can be obtained from the Area Manager, PA 110, Glasgow, or by writing to the Secretary, Health Board, Glasgow. Please apply to the Secretary, Health Board, Glasgow, by 1st August 1978.

You can join any one of 50 computer organisations as a customer engineer and go along quite contentedly. Join us and there is every chance that you will be racing along the road to success.

As a company we are dedicated to achieving success. In just 11 years we have established ourselves as one of the "top 25" computer manufacturers in the U.S.A. and in the U.K. we are leasing out our hardware as fast as we can.

We make our customers a pledge: If they have a breakdown, one of our customer engineers will be with them within two hours. It is a promise. We do not break it.

If you join us - you will find you have divided loyalties between us and your group of clients. And that is just how we want it to be. You will work from home and need ONC Electronics and around 3 years' experience

maintaining mainframe or minicomputers and associated peripherals. We have vacancies now in Birmingham, London, Bucks, Oxford and Basingstoke. You will be our most frequent contact with our clients, so you will need a good personality and manner plus, most important of all the determination to get the job done - at all costs under all circumstances. Back at headquarters we will look after you and treat you as an important member of our team. You will earn excellent money circa £5,000 plus at least another £1,000 for stand-by duties, plus a company car.

If you have all the drive, but up to now, no destination, take the road to success with Data 100.

Contribute to our success and your own. Contact: G. Hicks, Personnel Manager, Data 100 Systems Ltd., Arden Grove, Harpenden, Herts. Tel: Harpenden 63161.

Customer Engineers are our new breed of Diplomats



Amoco Europe Inc. Oil Industry Career for Programmer/Analyst

We are currently looking for a Programmer/Analyst to join a group of professionals involved in a wide range of commercial applications in the areas of finance, marketing and administration. Our installation comprises an IBM 370/138 operating under OS with teleprocessing links to several European centres.

If you are INTERESTED in the 'why' as well as the 'how' of business and in the concept of following through a problem to its solution then we would like to hear from you.

You should ideally be a graduate with at least three years' programming experience in COBOL and IBM operating systems. However, we would also be interested in hearing from technical programmers who wish to change to commercial applications.

The benefit package will prove very attractive to those earning around £5000 p.a. and will include four weeks' holiday, luncheon vouchers and a contributory pension scheme.

For further information, please contact: Brian McIntosh, Amoco Europe Inc., 33 Cavendish Square, London W1M 3HF. Tel: 01-408 2195.



WANTED

ICL 2960-2980 Application Programmers for Europe

£12000-£15000 p.a. & free apartment

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or write to CORRELATIVE SYSTEMS INTERNATIONAL, rue General Leman 43/45, BRUXELLES 1040 BRUSSELS

SYSTEMS ANALYSTS AND PROGRAMMERS to £5500

Tyneside

NO FORMS

NO APPOINTMENTS

NO DELAY

A major computer user based in Newcastle upon Tyne has vacancies for experienced systems analysts and programmers. Career development prospects are excellent and the systems varied including on-line applications.

CALL WITHOUT AN APPOINTMENT BETWEEN 4.30 pm and 9.00 pm AT:-

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The Holiday Inn
Great North Road
Seaton Burn
Newcastle upon Tyne
Monday 24th July 1978
Phone Wideopen 5432

NEWCASTLE UPON TYNE

The Swallow Hotel
New Gate Street
Newcastle upon Tyne
Tuesday 25th July 1978
Phone Newcastle 25025

GATESHEAD ON TYNE

The Five Bridges Hotel
High West Street
Gateshead on Tyne
Wednesday 26th July 1978
Phone Gateshead 771105

DURHAM

The Royal County Hotel
Old Elvet
Durham
Thursday 27th July 1978
Phone Durham 66821

Ask at the hotel reception for Ivor Norton. If you can't come this week please telephone Harrogate 66628 (reversing charges) to make a firm date.

LOCAL JOBS

MAJOR GROUP BENEFITS

OFFERS THIS WEEK

Ivor Norton Management Services Ltd

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COBOL PROGRAMMER

★ Opportunities for early promotion ★

£5,500 p.a.

based N.W. London

Our client is the UK subsidiary of an American company engaged in the manufacture of interactive terminals.

The parent company has a well established computing function, and the UK subsidiary is now about to install its first ICL 2903. As a result, they now wish to recruit a capable and experienced Cobol Programmer to handle the implementation of a wide variety of accounting applications, some of which will be based on systems operational in the USA, and others which he will create himself.

The company's DP plans envisage a continuous growth and development for at least 4-6 years, and as there are currently no plans to appoint a Systems of DP Manager, promotion prospects could be particularly good for the Programmer appointed.

In addition to practical programming work, there will be early involvement in systems design and you can expect to be working closely with the US computer operation in Texas.

Enquiries in the first instance by telephone to Tony Baker on 01-499 4501 (24 hour answering service) or if you prefer, write to him at the address below, quoting the reference RW 28/1.

ANALYSTS FOR TEHRAN

\$35,000 - \$45,000 P.A. Tax Free

Four experienced Systems Analysts are required by an American managed software house contracted to the Iranian Government.

Two are to work on the definition and design of Cultural/Demographic data collection, Statistics and Library Organisation methods.

Two are to work on the definition and design of Logistics Systems for the Military involving Inventory Control, Accounting, Supply and Distribution and Automated Warehousing.

After completion of the initial 18 month contract, future career opportunities will be available in the Middle East, Scandinavia and the UK.

Successful candidates can gain valuable experience on these very interesting and challenging projects, at the same time securing an excellent base for their financial future.

RW 28/2

Please call DAVID J. HUTCHINSON on 01-499 4501

hutchinson-scoggins recruitment

10 Dover Street London W1X 3PH

Telephone 01-499 4501

دانا من الهم

Programmers, Sales Engineers to bring in the next industrial revolution

Automation is a concept that's talked about a lot these days. But at BOC Automation, we're actually doing something about it. We're developing a whole new generation of micro- and micro-based systems for the automatic control and monitoring of industrial processes as far apart as brewing and laser welding.

Our work is a particularly effective marriage between advanced electronics and real-time computing. And as more and more companies throughout the world put the message about what our systems can do for their businesses, so we need more men and women to join us in these key areas of our work. We started from scratch four years ago, and our staff now exceeds 35.

Programmers

You'll be individually responsible for software projects on both mini and micro-based systems. You'll need a minimum of experience - ideally an PDP11's - in a process control or data monitoring environment.

Sales Engineers

As part of our current expansion programme we require additional specialist Sales Engineers, reporting to the Sales Manager, who will develop new outlets for our expertise in microprocessor/microcomputer-based Automation and Control Systems. Applicants aged probably 25-35 should have a successful track record in technical selling of electronics associated with data acquisition, monitoring and control to the processing and general industries field.

Although we're a small, personal company, we've the full backing of BOC behind us. And although we're totally committed to tomorrow's technology we're in a part of the world where houses are still at yesterday's prices. Salaries negotiable up to £6,000 depending on age and experience. If one of these roles looks like the next step in your career, phone our Engineering Manager, Dick Slater or our Sales Manager, Peter Dickinson, on Daventry (STD 032 72) 8026, or write to BOC Automation, 2 Morris Road, Royal Oak Industrial Estate, Daventry, Northants NN11 6PB.



Automation

GENERAL MANAGER

D.Prep & Processing Bureau
Enfield, Middx.

@ £8000 + company car and generous profit sharing

A well established and successful data prep bureau with facilities for punched card, paper tape, diskette and tape recording intends to expand into software support and application processing with a new small computer system which can provide file set-up and processing facilities simultaneously. The company will be moving into new premises in Enfield within 3 months and the new hardware will be available at the same time.

This senior appointment will be of interest to those who have practical experience in all aspects of Bureau operations and have an entrepreneurial instinct coupled with a good knowledge of organisation planning.

The successful applicant will be required to take over the total management of the D.P. division and implement the long-term policy of expansion already embarked upon.

Application in confidence to: Frank Morton

morpres data processing limited

33 Crawford St., London W.1



Computer Operators

£4150-£5882 p.a. inclusive

A strong progressive computer operation is essential for effective administration in local government.

Here at Westminster City Council, we've begun our journey to LUNIVAC 1106 with an expanding terminal network, including a new IBM 360/70.

As a member of a young dynamic team which appreciates the challenge of solving problems in a wide range of projects, which welcomes the chance to work in a friendly but professional environment and which values career development.

You will earn up to £4874 p.a. with at least 6 months experience on LUNIVAC 1106, 12 months on ICL system 4 or 18 months on IBM 360/70.

Salary scale, you'll find excellent conditions of employment, and an opportunity to progress with your career.

To obtain application form please send postcard, telephone or call at the Personnel Management Division (Ref. MS 156), Room 240, Westminster City Council, City Hall, Victoria Street, SW1E 9QP. Telephone number: 01-334 5881 (24-hour answering service). Closing date: 31st August 1978.



Recruitment Consultants

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Contract & Permanent

TEL
0565 4925
TODAY!

SYSTEMS ANALYSTS/
PROGRAMMERS

required urgently

Leading European Management Services Group requires professional experience in the computer field in Europe and also where German/Dutch reading capability is useful.

Please send your curriculum vitae to: 27 Stamford New Road, Attercliffe, Nottingham. Also to: 10, London House, Birmingham, B3 7EY.



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Salaries £4200-£6300

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We are now looking for more people to join us in Peterborough on projects which only a worldwide banking and travel group can offer you - a new international travellers cheque system... a major point-of-sale network for our branches... expansion of our real-time holiday reservation system... and systems development in central accounting facilities. In particular, we are looking for specialists in the following roles:-

Analysts

A major on-line project involving IDMS will very likely be your first assignment, therefore hands-on experience of a data base product or a telecommunications project would be a distinct advantage.

Ideally, you should have around three years' experience in analysis work, a good

background in programming, a flair for structuring business problems and the ability to follow through with user orientated solutions.

Strong leadership qualities are required for some of the more senior vacancies together with an exceptional ability for written and oral communication.

Analyst/Programmers

Our Branch Automation project involves IBM Series 1 equipment and PL/I. Successful applicants could well be numerate, recently qualified graduates with some University computing experience and strong bias towards small-scale computer systems. They must be versatile with strong technical potential and good inter-personal skills.

Programmers

Our main frame (IBM 370/138) programming department is engaged in a wide range of interesting work which includes on-line accounting systems and real-time holiday reservations systems. You would not need to transfer to analysts to succeed, as our structure recognises career progression to a high level within the programming activity.

We practise structured programming methodology in a way that results in total involvement in the design process. Positions exist at all levels and we will provide conversion training to meet our requirements for IBM main frame technology, ASSEMBLER and COBOL as necessary.

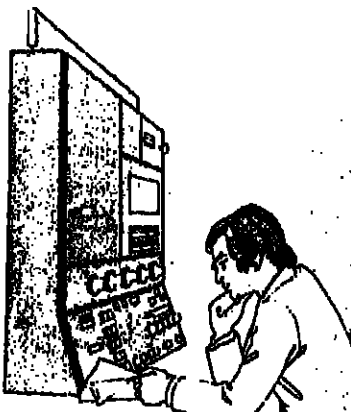
Senior O & M Analyst

A senior appointment calling for in-depth experience and flexibility to work on wide-ranging projects, including many of an interdisciplinary nature. Must be able to work independently, or, depending on the project, as leader of a small team.

All candidates must have a good university standard of education with English Language and Mathematics among their O level attainments.

Relevant work experience is essential, but we are prepared to supplement your skills with specific training in appropriate technologies if you can demonstrate the basic abilities we are seeking. Our cost-of-living review is effected 1st November annually.

Please write, giving details of your career to Terry Spiller, Personnel Manager, Finance Services, Thomas Cook Group Limited, P.O. Box 26, Peterborough PE3 6SB.



Main frame equipment is based on a half-night IBM 370/138.

Thomas Cook

Marubeni-Komatsu Ltd.

RPG II Programmer

To work in their Redditch Office. Salary is negotiable and excellent fringe benefits are available.

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NAAFI, the £240m commercial trading organisation serving H.M. Forces requires a "Punch Operator" to work in their Computer Services Department in Krefeld, West Germany.

A good, tax free, salary is payable with food and accommodation provided free of charge.

Applicants must have two or three years' IBM 8080 type 028-059 punching and verifying experience.

Please address applications to:

Personnel Manager (PD/R 730/CW) NAAF, Edinburgh House, 160 Kensington Lane, LONDON SE11.

EUROPE'S LEADING SPECIALIST RECRUITMENT CONSULTANTS SYSTEMS SUPPORT MANAGER

- ★ Salary to £17,000
- ★ London-based
- ★ IBM Operating Systems

We are currently advising on the appointment of a Systems Support Manager with a major mainframe marketer, to have responsibility for establishing and co-ordinating the support function in a wide geographic area.

The position, which is London-based, will entail up to 50% overseas travel (with consequent tax advantage) and the successful candidate will have an unparalleled opportunity to develop his career in the international computer market-place, with a corporation which is demonstrating outstanding profit-growth performance.

Confidential enquiries are invited from IBM-trained personnel (currently engaged in programme support, systems engineering or system programming activities) experienced with MVS, SVS, or OS/VS, having some supervisory experience and the ability to communicate effectively with Marketing and User personnel.

This is a rare opportunity for the right man and we will be short-listing at an early date.

For confidential consideration send your CV to the address below (quote reference CW931) or telephone reverse charge on 01-540 8311 (24-hour service). We will advise you on the relevance of your profile without obligation.

We are Europe's leading Search Consultancy to the DP industry and our business Standards guarantee your confidentiality. Your name will not be disclosed without your express permission.



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consultancy division

01-540 8311

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Data Base Administrator

for now, multi-site, on-line system

Throughout our operations here at ITT Components Group in Harlow, and at various company sites throughout the country, we make extensive use of computers. In order to increase still further the efficiency of our operational systems, we now wish to appoint a DP specialist to be responsible to the Technical Support Manager for setting up, administering and maintaining an effective data base system capable of meeting rapidly increasing information needs.

The man or woman appointed will be expected to continually review data base performance; maintain control over its accuracy and security and make such changes as may be required to accommodate new applications and improve performance. There will also be some responsibility for defining staffing requirements.

This is an important appointment calling for a degree calibre person with around three years' experience at senior level in a data base environment, preferably on Honeywell IDS equipment. The salary will reflect the responsibilities and importance of the position and benefits include 24 days' holiday, contributory pension scheme and, where appropriate, assistance with relocation expenses.

For more information telephone our Technical Support Manager, Pete Travell, on Harlow (0279) 28811 Ext. 2147, or write to: Jenny Sexton, Personnel Manager, ITT Components Group Europe, Edinburgh Way, Harlow, Essex.

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Scottish
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COMPUTER CAREER OPPORTUNITIES

The Scottish TSB Computer Centre currently provides a batch processing service to over 240 bank branches throughout Scotland and will shortly embark on the implementation of an on-line real-time system to be based on a large scale Burroughs B3800 mainframe and Philips passbook printing terminals.

The following additional staff are now required

PROGRAMMING STAFF — up to £6,363 p.a.

Applicants should have a minimum of three years' COBOL programming experience. A practical knowledge of data communications will be an advantage.

TERMINAL PROGRAMMING STAFF — up to £6,363 p.a.

Applicants should have a minimum of three years' system/programming experience working with terminals and/or mini-computers.

OPERATIONS STAFF — SHIFT LEADERS — up to £5,166 p.a.

Applicants should have a minimum of five years' experience working in a multi-programming environment with, at least, two years spent in a supervisory position.

Shift working is in operation and a shift allowance of £318 is payable.

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The Consortium offers a progressive and challenging career and, in addition to the salaries quoted above, the following excellent allowances and conditions of service will apply in appropriate cases:

- NON-CONTRIBUTORY PENSION SCHEME
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Alan Scott, Esq.
Data Processing Manager
Scottish T.S.B. Computer Centre
P.O. Box 38
12-30 Carmel Street
GLASGOW
G2 6PJ

MERSEYSIDE COUNTY COUNCIL DIRECTOR OF COMPUTER SERVICES JOINT COMPUTER UNIT

£9,893-£10,689 including supplement

The successful candidate for this post will lead the Merseyside Joint Computer Unit, which has responsibility for data processing for both the County Council and the Passenger Transport Executive. In addition work is done for and advice provided to Merseyside Police on computing matters.

An ICL 1904S under George 3, with 192K store and substantial communication facilities has been installed, and has about 2 years of its prime lease to run.

The Director must be professionally or academically qualified, and must also be able to demonstrate proven and broad based knowledge of computing, and extensive top management experience. Additionally, experience of large machine management, involving the provision of an operational and development service to multiple location users would be advantageous.

General local government conditions of service apply to this appointment, including the provision of a car allowance and generous relocation allowances where appropriate.

Please write or telephone for an outline job description and application form to:

County Personnel and Management Services Officer,
Merseyside County Council
P.O. Box 95, Old Hall Street
Liverpool L69 3EL

Tel: 081-227 5234 ext. 2322

The closing date for applications is 3rd August, 1978, with interviews planned for that month.

**Merseyside
COUNTY COUNCIL**

COMPUTER MANAGER

We are a rapidly expanding Computer Magnetics Manufacturing and have recently installed an on-line Business system using a Prime 300 (128K) Computer. We require a capable person for its day-to-day management, including staff education and assistance.

Additional administrative duties are envisaged, making this a senior appointment within the Company at a competitive salary with exceptional fringe benefits.

Write to, or phone Miss K. Lyhas for an application form.

NORMAN MAGNETICS LIMITED
Inverclyde Road, Farnborough, Hampshire, GU14 7NF
Telephone: Farnborough (0252) 510288

TELSYS INFORMATIQUE

A large computer services organisation based in Paris requires

SYSTEMS ENGINEERS

to work on

IBM 370-158, 168 and 3031 computers

Applicants should have a University degree or equivalent and a minimum of 3 years' experience of IBM-OS. Some knowledge of MVS or VM would be desirable.

The work will initially be located in Paris, with the possibility of moving to other sites in France and abroad, after the first year if desired.

Relocation expenses and an attractive salary will be offered.

Please write with brief c.v. to: Telsys Informatique, c/o SGS Datensysteme GmbH, Friedrich Str 10, 8000 Frankfurt, West Germany. Attn: Peter Porzgie.

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PROJECT LEADER

£17,000 P.A. TAX FREE

- ★ MIDDLE EAST
- ★ IBM HARDWARE
- ★ FINANCIAL SYSTEMS
- ★ 2 YEAR CONTRACT
- ★ FREE ACCOMMODATION

Our Client, an International Consultancy is seeking a Senior Analyst or Project Leader who has experience of Banking or Financial Systems. Applicants will have been responsible for at least two major projects — from design to successful implementation.

The Project involves the implementation and training of staff and the successful applicant will be interfacing with American banking professionals. The position is for a two-year contract in the first instance with the possibility of joining this International Consultancy in a permanent position on completion of the Project.

Ref. W1/2007

MYRIAD APPOINTMENTS LIMITED Computer Personnel Consultants
Telephone or write to:- 30 Fleet Street London EC4Y 1AA 01-353 0981 (24 hrs)

Abraxas Recruitment Division

ABRAXAS

West End House,
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London W1R 1AG

01-439 8891

OPERATIONS

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IBM DOS/VS £4,500
C. LONDON. Two international companies require experienced DOS OPERATORS. Both run TWO SHIFT systems. Days and Evenings, and employees enjoy a great many benefits. These include Free/Club Restaurants, Annual Bonus, Non-Cont. Pension, Season Ticket Loan and 4 Weeks' Holiday.

ICL 1900 To £4,300
C. LONDON. Two OPERATORS with some knowledge of GEORGE II/H+ required and a minimum of one year's total experience. A three-shift role in operation and conditions of employment include an excellent annual bonus scheme.

DATA CONTROLLERS
Experienced DATA CONTROL CLERKS are required for various installations/hardware at both Junior and Senior levels. Salaries vary with age and experience but range between £3,000 to £5,000. Ring Abraxas now for details of vacancies in your area.

PDP/DEC c. £4,000
C. LONDON. OPERATORS Required with or without PDP/DEC experience for rapidly expanding installation. Excellent prospects and generous fringe benefits including restaurant and staff mortgage and the opportunity to WORK ABROAD.

HONEYWELL c. £4,500
W. MIDDX. SHIFT LEADER and OPERATOR. Required for new machine running under GCOS, although OS2000 would be considered. 4 weeks' hols., restaurant and two shifts.

ICL 1900/2800 c. £4,000
HANTS. Positions for both OPERATORS and a SENIOR OP. with 12 months + exp. on 1900 or 2800 hardware. Swift career progression is assured both in operations and into related D.P. sections for applicants with the right aptitude. Excellent working conditions including subsidised restaurant/lbr. Pension scheme and 4 weeks' holiday.

FOR VACANCIES IN YOUR AREA PLEASE RING ABRAXAS NOW

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BURROUGHS c. £4,600
W. LONDON. OPERATORS required for well-established configuration undergoing system modification which has created openings for experienced operators, who wish to further their experience. Excellent working conditions and staff benefits.

TRAINERS/JNRS. To £3,000
Many vacancies exist in and around the London area for JUNIOR OPERATORS with at least four "O" Levels. Must be prepared to work shifts. For more details on jobs in your area, ring ABRAXAS NOW.

N.C.R. c. £4,000
C. LONDON. OPERATORS required for various positions in and around London. Minimum of six months' experience required.

IBM OS/VS1 £4,500+
OS/VS1 experience is currently much sought after by many companies situated in an around LONDON. Salaries are highly competitive together with many varying company benefits. Mortgage subsidies. Travel concessions. Life Assurance. Restaurants/LVs and BUPA. Contact Abraxas for further details.

1900/GEORGE II £3,850
MIDDX. An extremely attractive opportunity for an OPERATOR with 12 months' experience on ICL hardware. The large manufacturing concern require applicant with an "O" level education to work in a three shift system. Company benefits cover Free Meals, Life Assurance, Pension Scheme and a Social Club.

Abraxas Computer Employment Ltd.

Time-sharing Computer Network

Telecommunications Data Transmission Engineer

This international data-communications network with more than 100 linked computers offers a unique blend of computer time-sharing and remote batch processing capabilities covering a very large variety of commercial data processing and business information systems.

The specialist engineer is required to monitor and maintain the operation of telecommunications, line concentrator and transmission equipment. He/she will correct faults and overcome problems in the system and liaise with the British Post Office, terminal users and equipment suppliers.

Candidates must be qualified or suitably experienced telecommunications engineers with knowledge of either high or low speed equipment operating with both leased circuits and the public switched telephone network.

The candidate will be expected to work shifts covering the period 0700 to 2000 Monday to Friday and will be based in N.W. London.

The salary will be negotiable around £5,000 p.a. (including shift allowance). A company car will be provided together with usual fringe benefits.

Please send brief details — in confidence — to David Bennell ref. PY.43553

This appointment is open to men and women.

MSL United Kingdom Australia Belgium Canada
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DISCUS

DCSL

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YORKSHIRE BASED
INCOME £10K + +

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Avis are the acknowledged world leaders in vehicle rental and we are installing an IBM 3031 at our European Headquarters in Bracknell. This will be linked via private telephone lines to terminals and mini computers in many European countries. This development requires:

Shift Leaders c£5,800

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All candidates must have experience operating large IBM mainframes under OS, the operators for a minimum of one year and the shift leaders for a minimum of two years. In addition the shift leaders must have six months relevant supervisory experience and a sound working knowledge of OS JCL.

Salary and job prospects are excellent within our expanding Systems Department, with opportunities for career progression either in computer operations or programming and systems development.

The company offers a non-contributory pension scheme and subsidised staff restaurant as part of the benefits package. Rented housing may also be available.

AVIS ARE ABLE TO OFFER A UNIQUE OPPORTUNITY FOR THE SUCCESSFUL CANDIDATES TO BECOME ACTIVELY INVOLVED IN THE PRE INSTALLATION PLANNING OF THE 3031 WHICH WILL BE OPERATIONAL IN DECEMBER 1978. THESE POSITIONS MUST BE FILLED NOW, SO ACT QUICKLY.

Avis House is situated within easy access of the M3 and M4 Motorways and is convenient to Bracknell Railway Station on the Reading to Waterloo line.

For an application form or further details please write or telephone Colin White, Computer Operations Manager, Avis House, Station Road, Bracknell, Berkshire RG12 1HZ, telephone Bracknell 26644, Ext 251.

AVIS

Management Services

UNIVERSITY OF PETROLEUM AND MINERALS
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IBM 370/158 3MBYTES CURRENTLY RUNNING VS1 REL. 6.00 WITH TONE

The University of Petroleum and Minerals requires experienced

SYSTEMS ENGINEERS

whose main functions will include:

- (1) Hardware maintenance of non-IBM equipment.
- (2) Possibility of attaching and being responsible for a Hardware Monitor.

The university has some six minicomputers with associated devices. Our intention is to obtain modular devices which can be maintained, in house, at the card level. We are also bringing in dial-up facilities, more minis, NOS terminals and possibly graphics terminals.

Engineers with fault-finding experience and a knowledge of integrated circuits and/or communications systems are invited to apply. Ideally candidates would have a knowledge of Assembly language as well.

Minimum regular contract for two years, renewable. Competitive salaries and allowances, free air conditioned and furnished housing provided, free air transportation to and from Dhahran each two-year tour, attractive educational assistance grants for school age dependant children, all earned income without Saudi taxes. Ten-and-a-half months duty each year with 45 days' vacation paid.

Apply with complete resume on academic and professional background, list of references, with copies of transcripts/degree testimonials, including personal data such as home and office addresses, telephone numbers, family status (wife's maiden name, names of children, ages and sexes) to:

Miss Elizabeth Whitechurch
University of Petroleum and Minerals
C/o Gables Training Centre Ltd.
Brougham House, 7 and 8 Backville Street
Pleasance, London W1X 2BR
Interviews are due to be held on 14th and 15th August.

Do you speak French?

Data Prep Programmer with at least two years experience to work with a leading English Mail Order company and liaise with its French office on a variety of projects. Good salary and opportunity for advancement in a growing company. Write in confidence with details of experience to date to:

Leonard Joseph, Managing Director,
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UNIST

University of Wales
STATISTICAL PROGRAMMER

Department of Computing

as Computer Officer to help

research workers choose and

apply statistical methods to

their computing, to give

courses in statistical packages

and to help with the running

of the university computing

service. Applicants should either be

qualified in statistics or be

experienced in using statistical

packages. Salary: Grade 1A £3880 to

£6178. Requests (quoting Ref. CW)

for details and Application

form to Personnel Section

(Academic), UNIST, Cardiff

CF1 3NU. Closing date: 11 August, 1978.

UNIVERSITY OF EDINBURGH

RESEARCH ASSOCIATE PROGRAMMER

Required by the TOURISM & RECREATION RESEARCH UNIT.

Applicants should possess experience in IMP or ALGOL. The work will involve

the analysis and preparation of various

survey and field use data sets and the

preparation of statistical reports using

standard packages and special purpose

programs. Salary will be on scale £3,100-£4,000.

Further particulars may be obtained from The Secretary, IRRU, High School Yards, Edinburgh, EH1 1NR.

Telephone: 031-226 3871. Please quote reference 1021.

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Raytheon Cossor Data Systems is Europe's leading independent manufacturer of advanced terminal systems. Our programmable PTS 100 is widely used; widely respected and very successful. Our future products, including microprocessor based systems, will maintain the lead we have established in the UK and mainland Europe.

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We need analysts and programmers for new product development from the earliest stages, and for terminal systems applications. The work will be technically demanding and will carry considerable responsibility. There will be opportunities for travel in Europe and the United States.

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Applications will cover:

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Perhaps only the major computer manufacturers can offer such a wide variety of original software development, involving the very latest techniques and technology. Except that with RCDs you'll work in far smaller teams. See more of the overall project. Contribute more. And progress more quickly.

Applicants should have experience in the implementation of on-line terminal systems. They should have worked on minicomputer applications or on communications or terminal handling software on IBM, ICL or Univac mainframes. A degree in computer science or an allied discipline is desirable but not essential.

Analysts will have at least four years relevant experience, preferably with recent responsibility for the work of other staff. Programmers will have one to three years experience.

Technical Support

The best products demand the best possible technical support. We need Senior Software Specialists for pre- and post-sales support to users and to our own sales and project teams. Candidates will have rare qualities: the ability to learn our product software totally, to troubleshoot in a wide variety of client environments, to advise creatively on proposed systems and products. They must be energetic and mobile. Ideally, candidates will have worked in technical support with a minicomputer manufacturer. Rewards and prospects will be excellent.

The chances are that Raytheon Cossor Data Systems can offer you the next step in your career that you'd hoped for but perhaps thought you wouldn't find. And the work prospects apart you'll enjoy our intelligent location. If you already live within easy reach of Harlow you'll welcome the lack of commuting. If not, housing in Essex still represents excellent value and we will give assistance with relocation.

Write to: W. D. Barrow
Raytheon Cossor Data Systems
The Pinnacles, Harlow
Essex CM19 5BB

Raytheon Cossor Data Systems

من الأحرار

UNITED KINGDOM ATOMIC ENERGY AUTHORITY

Harwell Central Computer

We have a vacancy at Executive Officer level for a Communications Controller for Harwell's Central Computer.

The work is concerned with the control and supervision of the network interfaces to the IBM 370-168, which provide for the attachment of over 300 terminals of various types. It will involve fault investigation and testing of network components (i.e., terminals, modems, connections, front-end computers) to instigate corrective action, planning and ordering new communications equipment and cabling, and supervising and progressing its installation and correct functioning. The Controller will also maintain records and logs detailing network components and allocations.

Applicants should have experience of computer operating or programming and a knowledge of JCL. In addition there is a minimum requirement of 5 GCE passes including English Language, 2 of which must be at Advanced level.

Starting salary will be between £2727 and £4019 per annum, depending on age.

For an application form write to:

Mrs. S. Deakin, Personnel Department, AERE, Harwell, Oxon, OX11 0RA,
or telephone Abingdon (STD 0235) 24141, ext. 2059.

If you have any queries about this vacancy, please telephone Extension 3227

UKAEA HARWELL

PROGRAMMER (M/F)

GERMANY (£11,000 p.a.)

We are a leading importer and wholesaler of technical products, situated in Stuttgart/Germany.

We require a Programmer with comprehensive Cobol experience, at least two years, in solving commercially oriented problems, e.g. Stock Control, Invoicing, Book-keeping, etc.

A knowledge of RPG would be helpful, but is not absolutely necessary.

You are probably a self-motivating, independent person seeking a responsible post abroad. Additionally you will possess a sound knowledge of German.

Salary consists of 13 monthly payments of 3,300 DM. Starting date: 1st-15th September, 1978.

Please write enclosing comprehensive details of career to date and a passport size photograph. The application should be written in German.

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Nordbahnhofstrasse 31 : 7000 Stuttgart 1/Germany
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SUNDERLAND POLYTECHNIC
FACULTY OF SCIENCE
Department of
Mathematics and
Computer StudiesSENIOR LECTURER
IN COMPUTER
STUDIES
(SYSTEMS
ANALYSIS
AND DESIGN)

Applicants should be graduates, or possess equivalent professional qualifications, and should have recent practical experience outside the field of education.
The successful applicant will have a senior role in a small team responsible for courses up to honours degree level in Data Processing.
Salary Scale: Senior Lecturer Grade 6b £51,277-£58,547 p.a.
An application form and further particulars may be obtained from the Personnel Officer, Sunderland Polytechnic, Chester Road, Sunderland S81 3SD, and should be returned as soon as possible.

TRAINEE SALES
for someone with
OPERATIONS/RJE ex-
perience. London or
Manchester based.
Telephone
01-828 7567MERSEYSIDE COUNTY COUNCIL
PROJECT LEADER
(£6,727-£6,702 p.a.)
SYSTEMS ANALYST
(£5,232-£5,688 p.a.)

The successful applicant will assist in the design and development of dedicated on-line computer systems for Merseyside Police, including developing and implementing Police Command and control and information systems from the Operational Requirements stage to maintenance.

Candidates should possess a professional qualification and a knowledge of N.C.C. standards of documentation would be an advantage.

The Project Leader should have a programming background, preferably in real time systems, with working knowledge of a low level language and two years' experience as a systems analyst.

The Systems Analyst should have two years' programming experience, and a sound knowledge of CORAL 88, or equivalent language.
Application forms, returnable by 7th August, 1978, and further details from the Chief Constable, Merseyside Police, Police Headquarters, P.O. Box 59, Liverpool L69 1JD in envelopes endorsed with job title, or telephone 061-709 6010, ext. 2153.

SYSTEMS ANALYST
&
ANALYST/PROGRAMMER

PERMANENT or CONTRACT from September, INITIALLY TO WORK IN N.E. LONDON with our existing team to develop COBOL based MANUFACTURING SYSTEMS.

CONTACT: (AN GOLD on 01-388 0636

Fraser Williams
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To join team implementing
DG ECLIPSE BASED INTERACTIVE
COMPUTER SYSTEMS

which will support the operational functions: planning/budgeting tasks and routine administration of the Iranian National Blood Transfusion Service.

SENIOR ANALYST/
PROGRAMMER

approx. £18,000 (2,100,000 Rials) p.a. + termination bonus and car

He/she will undertake detailed systems design, with special reference to applications oriented aspects and the systems/software interface: systems testing and documentation; user training and documentation; on-the-job training of Iranian analysts and programmers.

Applicants should have relevant university degree, 7-8 years' practical experience of systems design/implementation and of programming (in more than one language, including Assembly or equivalent), using several different makes of hardware on a variety of applications, in recent years should have been working on the implementation of multi-based interactive systems.

SENIOR PROGRAMMER

approx. £16,000 (2,100,000 Rials) p.a. + termination bonus and car

He/she will undertake specification, checking and testing of programs (including the most complex ones); scheduling and supervision of programming and program documentation, technical evaluation and acceptance of software acquired from external sources; on-the-job training of Iranian programmers.

Applicants should have relevant university degree, 7-8 years' practical experience of programming (including the management of programming teams), a significant proportion in software development (including DBM and/or terminal handling), using several different languages, which must include Assembly or equivalent, on more than one make of hardware in recent years should have been working on program/software development for multi-based interactive systems in a senior capacity.

SYSTEMS PROGRAMMERS (two)

approx. £14,000 (1,800,000 Rials) p.a. + termination bonus

They will undertake the programming and documentation of the DUM-related, census handling and more complex application programs, will provide assistance, supervision and on-the-job training for Iranian application programmers.

Applicants should have relevant university degree, 5 years' practical experience of programming, a proportion of it on software development (related to DBM and/or terminal handling), using several languages including Assembly or equivalent, on more than one make of hardware; in recent years should have been programming for interactive multi-based systems.

All appointments will be for a minimum period of 18 months. A housing allowance is included in the salary and additional benefits include 6 weeks' paid leave p.a. and generous relocation allowance.

Applications (stating which appointment they are for), with curriculum vitae, should be addressed to: Box No. 1957, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU; interviews will be held in London during August.

EDP Opportunities

Saudi Arabia £8,800-£10,900 (after tax)

The Arabian American Oil Company (ARAMCO), the major developer of petrochemical resources in Saudi Arabia, currently requires the following staff for its Commissary Department.

Systems Analyst/Programmer

You will study and document all EDP systems and procedures for its Commissary Department. This will include the preparation of user instructions and carrying out training sessions with EDP input procedures. You will have the ability to investigate and solve EDP related problems and, although not expected to write programmes, will be able to understand those already written. A good knowledge of COBOL, PL1 programming languages and a mark 4 training would be beneficial.

Stock Control Accountant

You will have a sound knowledge of inventory control procedures (preferably computer-based) and ideally you will hold a HNC in administration or accounting and at least 5-years' practical experience in materials accounting and stock control; a further 5-years' experience would however be a suitable substitute for formal qualification.

In both cases, a full UK driving licence is essential.

Bachelors have 30-days' paid leave between contracts; Married men on single status have two-weeks' paid UK leave every four-months and 25-days' leave between contracts.

For further details, please write or telephone quoting reference 8350 to Richard Darvell at Astral Recruitment Associates, 17/19 Maddox Street, London W1R 0BY. Telephone 01-629 2356 (ansafone after 6 p.m.).

ARA
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<p>JUNIOR PROGRAMMERS £2900 to £4700 Just a year's exp or less? Much more! All areas. All ages. All abilities. 01-995 3863 FREEPOST LONDON W4 3BR</p>	<p>CAPITAL APPRIS GRADUATES Urgently required for finance positions: Commercial, Scientific, Industrial, Sales, etc. 03 004 ALL AREAS 017 5551 ext 626 9659 ext 626 FREEPOST LONDON W4 3BR</p>	<p>ASSEMBLER PROGRAMMERS £4000 to £5000 Manufacturers & Systems Houses need you on micro, UK & overseas. 01-995 3863 FREEPOST LONDON W4 3BR</p>
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SENIOR PROGRAMMER

WEST LONDON to £6000 + EX. BENEFITS

This is a marvellous opportunity for a programmer with upwards of 3 years' COBOL experience to join a first-class employer in West London. The company's premises are easily accessible from a number of local tube and main line railway stations, in addition, ample car parking is available.

Extensive ICL hardware is utilised and forms the base for a number of on-line systems.

Career development is encouraged, there is a friendly working environment and the company benefits are almost unbeatable. Interested? Then to find out more, why not ring the number below quoting ref: CW 23-8S.

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19 PARK STREET, CROYDON, CR9 1TN | FAULKNER STREET, MANCHESTER M1 4YD

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS
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SENIOR PROGRAMMER

THE COMPANY:

A statutory organisation providing insurance against the high cost of serious illness. V.H.I. has recently installed a Honeywell 82/60 Computer with disk and tape systems using 192K Memory and associated V.D.U.'S.

THE CANDIDATE:

Applications are invited from persons with 3 to 5 years' Cobol programming experience, preferably on a Honeywell computer. Knowledge of Communications programming an advantage. The successful candidate will be capable of working as part of a team.

BENEFITS:

Attractive salary commensurate with qualifications and experience backed up by an attractive range of fringe benefits and excellent working conditions.

Applications giving full details should be made to the Personnel Manager:



Voluntary Health Insurance Board

AN BORD ABACHAS SLAIVE SHAOIRALACH
VHI House 20 LOWER ABBEY STREET DUBLIN 1 TELEPHONE (01) 749171 748751

Basic Programmer

£3,250 - £4,500 p.a.

COMPANY:

Music Hire Group Limited is a rapidly expanding company in the early stages of developing a distributed processing system linking intelligent terminals in its ten regional offices to PDP 11/34 and PDP 8 computers.

POSITION:

The successful applicant will join a team of analysts and programmers and will be involved in writing programs on PDP 11/34 and Micro Processor machines. Some systems work may be involved depending upon applicant's ability.

EXPERIENCE:

One year's programming experience, preferably in a commercial environment.
Please write or phone:

Mr. P. A. Riding
Data Processing Manager
Music Hire Group Ltd.
Low Lane, Horsforth
Leeds LS18 4ER
Telephone 589495 ext. 238

MHG MUSIC HIRE GROUP

CITY OF LONDON
POLYTECHNICSENIOR
COMPUTER
OPERATOR

The Computer Service provides comprehensive computing facilities for ILCA Polytechnic, Schools and Colleges.
A large multi-access real-time system is installed in a self-contained computer building of the Polytechnic incorporating medium sized main store, on-line disc store, a full range of peripherals and supports over 100 local and remote interactive terminals.

In addition two smaller systems provide multi-access for Schools and Colleges of the ILCA.

The Senior Operator will join a small team working a two-shift system. Preference will be given to applicants with operating experience / supervisory experience in a medium / large multi-access installation. However, all applications received will be considered on their merits.

Salary offered is on a scale from £3,560 55 rising to £4,288.00 (under review) plus shift allowance of £287 p.a.

Annual holidays are 21 days plus 1 day per month "option day".

Further particulars and an application form may be obtained by applying in writing to the Assistant Director, City of London Polytechnic, 117/118 Houndsditch, London, EC3A 7BU.
Closing date will be 3rd August, 1978.

THE UNIVERSITY OF
MANCHESTER
FACULTY OF ECONOMIC AND
SOCIAL STUDIES

There is a vacancy for a

COMPUTER
PROGRAMMER

in the Research Support Unit, to assist staff and postgraduate with their computing problems. Applicants should be graduates with a reasonable mathematical background preferably including some study of statistics. Knowledge of either ALGOL 60 or FORTRAN is essential. Candidates familiar with this University's Regional Computer Centre system will be preferred. Appointment is initially for one year but is potentially permanent. Salary range p.a. £3,180-£4,801. Particulars and application form (returnable by July 28th) from the Registrar, The University, Main entry 41/3 B1, Dyke rd, 176/78/80, CW.

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Communications
Network Controller

£6,000 negotiable Surrey Based

Our client is a substantial engineering corporation with factories and associated data processing facilities in all major European countries, linked by a modern telecommunications network and mixed mainframe/minis of advanced specification.

The advertised position offers great freedom of action to an experienced communications specialist who will need to liaise on a national and international level with all the main disciplines associated with such data processing — end-users, divisional management, mainframe technical support experts, etc.

The salary and other rewards for this position are in keeping with the status of the client's international activity.

Write initially with brief career details to:
The Managing Director
Microstar Limited
Hitherbury House
97 Portsmouth Road, Guildford, Surrey GU2 5DL
Telephone Guildford (0483) 33031

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CALCOMP
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An experienced Calcomp (or similar) operator is required to operate our CALCOMP 748 Flatbed and 1061 Drum Plotters.

An excellent salary will be offered. Modern offices and friendly atmosphere. Opportunities for progression into Data Processing.

Forward requirements to:

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NORTH STAFFORDSHIRE POLYTECHNIC
RESEARCH ASSISTANT

Department of Computing

RESEARCH ASSISTANT

Applications are invited from suitably qualified graduates, for a post as Research Assistant in one of the following fields:

1. Speech understanding systems;
2. Computer Architecture — development of graphics, data capture systems and associated interfaces;
3. Microprocessor systems development;

Salary: £2727 per annum including supplements.

A second post is available in one of the above areas for which a Science Research Council Studentship is available.
Further details and application forms are available from the Establishment Officer, North Staffordshire Polytechnic College Road, Stoke-on-Trent ST4 2DE.



11, Stamford House
Stamford New Road
Atherstone
WAI 4 1BL
Tel. 061-941 4509/061-928 5255

Contract Requirements

£150-£300 per week
(plus expenses where applicable)

ICL

Analyst — 1900 — Newcastle — 3 months
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System 4 Usercode Programmer — North West — 6 months
1900 Driver, 2903 — ETS Programmer — North West — 2 months
1900 George III writing beads — North West — 3 months
2800 VME COBOL + IBM experience — Programmer — Luxembourg
(October Start)
1900 Plan Programmers — Scotland — 3 months
2850/60 COBOL Programmers — North West — 6 months

OTHER

Singer 1500 Programmer — North West — 4 weeks
Analyst H/W 66 — Newcastle — 6 months
Singer System 10 — various — 3/6 months
O + M Analyst H/W 66 + 1900 — Newcastle — 6 months
Hewlett Packard 3000 + Image database — North West — 8/12 months
Coral Programmers — North Sea Oil Rigs — 6 months (2 wks onshore/2 wks offshore)
Varian COBOL + DAS Assembler — North West — 3/6 months
Dibol Programmers — North West — 3 months
RSX II — Software/Message Switching — London — 9/12 months
Level 80 CMAP — Scotland — 3/6 months

All of these contracts start within the next 2 weeks (except where stated).

For more details of these and other requirements please contact:—
Sue Davies or John Christian on the above office numbers.

Tel. Evening/Weekend
Sue — 081-707 1590
John — Rochdale 54726

Emp. Agency Licence No. NW419



Computer controlled telephone exchanges U.K. and Holland

A recent large order from Saudi Arabia for the manufacture and supply of computer controlled telephone exchanges has confirmed Philips position as one of the world leaders in this field.

This, plus enhancements and additions to the range of switching systems has created vacancies within the international development team working on these systems. Opportunities exist at the U.K. base in Malmesbury, Wiltshire, where laboratories of Philips Telecommunications and Pye TMC are located and at the Dutch headquarters of Philips Telecommunications in Hilversum.

The development effort extends into the fields of space and time division switching, local and trunk applications, the integration of microprocessors and network maintenance and management centres.

The following staff are required to work in the area of real time telephony application, basic operating system design and general support tools.

Software Systems Designers

At least 4 years experience in real time or control systems software design is essential. Telephony or telecommunications experience would be an advantage.

Systems Programmers

At least 2 years assembler language experience is required. Experience on small computers and/or control systems would be advantageous.

Programmers

Applicants should be either recent graduate level or from a course with a large computer content of programming experience in a high level scientific language.

Salaries for the U.K. vacancies will be within the range £4,000 to £7,000. The Dutch vacancies can be filled either on a permanent basis or on a two/three year contract basis.

Malmesbury is situated in the north west corner of Wiltshire and combines a town of historic interest with all the amenities of a modern community. Motorway systems and good class roads bring it within easy reach of most major towns and cities.

Hilversum is located approximately 20 miles east of Amsterdam.

Please write with full details of career progression to Jane Thomas (SBS), Pye TMC Ltd., Swindon Road, Malmesbury, Wiltshire.



Project Managers, Systems Analysts, Cobol Programmers Amongst the best opportunities in Essex!

Chloride Automotive Batteries is the largest and most successful British manufacturer of lead-acid batteries. As part of the International Chloride Group we offer excellent experience and promotion prospects.

The company has announced its intention of replacing the ICL 1902S at Dagenham with a 2900 series and to embark on a new and substantial systems development programme. It will cover new real time systems in the commercial manufacturing and financial areas, using the latest communications and data base techniques.

Benefits include a good salary, contributory pension, life assurance and sick benefit scheme, four weeks' holiday, subsidised staff restaurant, active sports and social club and generous relocation assistance if needed.

Applicants should telephone or write for an application form to M. Berry, Personnel Department, Chloride Automotive Batteries Limited, Chequers Lane, Dagenham, Essex RM8 8PX. Tel: 01-592 4560.

Project Managers up to £7,000.

5 years' experience in commercial programming and systems development, knowledge of on-line data base techniques and project management experience is essential.

Systems Analysts £4,250.

2 years' good commercial systems analysis experience coupled to an ambitious professional approach, some knowledge of on-line systems and data base techniques would be an added advantage.

Cobol Programmers £5,250.

With upwards of 2 years' 1900 cobol experience. A knowledge of Plan, Driver or George II would be an advantage.

CHLORIDE

I require urgently: PROGRAMMERS

with one year's IBM
Cobol, unlimited pros-
pects to £6,000 p.a.

Interviews any time,
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24 hours

QUEEN MARY COLLEGE University of London COMPUTER SCIENCE & STATISTICS DEPARTMENT

Applications are invited for appoint-
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Preference will be given to candidates
with research interests in Computer
Systems, Hardware and Software.
Teaching topics include undergraduate
and postgraduate courses. Salary in
lower half of scale £30,500-£37,000 p.a.
plus £4,000 London Allowance.

Applications should be sent to the Registrar, Queen
Mary College, University of London,
115, St. John's Road, London
E1 4NS, to be received by 15 October.

PROGRAMMERS AND ANALYST

Circa £2,000 to £5,500 negotiable

We are an established software house in commercial pro-
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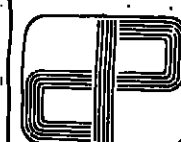
ANALYST — having one year's systems practice in addition to a
sound programming background.

PROGRAMMER — having at least one year's programming
experience.

JUNIOR PROGRAMMER — having up to one year's program-
ming experience.

TRAINEE PROGRAMMERS — having completed a university or
technical college course in computer science.

Applications in writing stating full details of experience,
employer, age and salary, to:
Brimley Ltd.
Gale Buildings, Cook Street, Coventry



Computer Data
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Limited

EXPERIENCED OPERATIONS STAFF

Salary £4,400 p.a. (inc. shift allowance)

Due to further expansion, experienced operators and
control clerks are required to join our efficient and
hard working Operations Team.

The configuration consists of two large ICL System
4/72s plus VDUs and RJE's.

Ideally, applicants should have two years' experience
on either System 4 or IBM 380/370 machines and a
good knowledge of JCL.

Three-shift working is in operation in both the
Computer Room and Control Department.

A 32½-hour week is worked plus four weeks' holiday
after one year's service.

Our office is located very close to the main-line
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Applications to:
Alan Merrion,
Operations Manager
Computer Data
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Oakfield House
Perryman Road
Haywards Heath
Sussex
Telephone:
Haywards Heath
59188

ipc

HALTON BOROUGH COUNCIL CHIEF FINANCE OFFICER'S DEPARTMENT COMPUTER SECTION

An Order has been recently placed for an ICL 2904 with
Discs, Magnetic Tapes and DDE's to replace the present
ICL 1901 installation and is due to be commissioned in
the Autumn. It is envisaged that future developments
will cover a wide range of applications including on-line
systems.

SENIOR ANALYST/ PROGRAMMER

Grade AP5/501 £4,773-£5,558

Applications are invited for the above posts from persons
with several years systems experience using Discs and
Tapes and a programming background which includes
COBOL. The successful applicant must be able to take
charge of a system from investigation to implementation
and be capable of negotiating with user Departments. A
knowledge of ICL 2903 job control language and direct
data entry equipment is desirable but not essential.

ANALYST/PROGRAMMER

Grade AP3/5 £3,732-£5,073

Applicants must have at least 2 years' COBOL program-
ming experience using Discs and Tapes and a minimum
of 1 year's systems analyst work.

The above posts are based in Widnes, and a system of
flexible working hours is in operation.

The Council will be willing to pay in an appropriate cases
reasonable removal expenses and make available
accommodation to the successful applicants.

Applications in writing, giving details of age,
qualifications, experience, together with the names
and addresses of two referees, should be for-
warded to the Head of Personnel and Management
Services, Halton Borough Council, Municipal
Building, Kingsway, Widnes, Cheshire, WA8 7QF.
Closing date 21st July, 1978.

R. Turton
Chief Executive

COURSES

DEPARTMENT OF COMPUTING SCIENCE SRC SHORT DURATION COLLABORATIVE TRAINING AWARDS (SDTA) 1978

The Department has in conjunction with RAYCEN Ltd. a project proposed on the
subject of 'The effect of the computer on the business of the future'. The project
will be a 12 month project and will be carried out by SRC on the
basis of a grant of £10,000. The project will be carried out by SRC on the
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Systems Performance Measurement & Simulation

Logica's computer performance analysts have pioneered
measurement and simulation techniques since 1969.
Demand for our services is such that we need to recruit
staff with general experience in

- systems programming especially IBM VS, Honeywell
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- use of hardware or software monitors to tackle
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Logica is already active in the rapidly developing field of
data-bases and systems security. We are keen to recruit
more senior staff with experience in

- data-base administration
- particular packages especially Codasyl, IMS, TOTAL,
ADABAS, mini-computer based systems
- data integrity & recovery
- data management in distributed systems
- systems security especially audit

You should have worked in one or more of these areas
and be keen to develop your experience by solving
problems for Logica's clients in the UK and overseas. You
will also need the personality and ability to communicate
effectively with all levels of technical and managerial
staff. Based in central London you will have the
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motivated staff. We would expect you to contribute to
the development and growth of these dynamic business
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Arrange a meeting with one of our senior professional
staff by calling Paula Freed on 01-637 9111, or write to
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moving through On-Line Order Entry to a Stock Control
System, and Production Control, using an ICL 2904 and RPG
II.

The Analyst, who will be based in King's Norton, will need
System 3, 32 or 34 experience. He will be responsible to the
DP Manager and will be liaising at Director level.

The Programmer, who must have 2903, 4 or 1900, and
On-Line experience, will be based at Redditch.

For both positions RPG II is a must.

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TOP SALESMEN AND SALES MANAGER

E.M.S. is planning substantial further development of both our Consultancy and Turnkey Systems Divisions during the coming months. Our Consultancy activities extend across all mainframe ranges and encompass a wide range of industrial/commercial organisations. Applications must, therefore, present as high level Business Analysts capable of rapidly assessing clients' requirements and proposing relevant solutions where appropriate or programming and providing the necessary staff from E.M.S. resources. A vast potential market exists for salesmen marketing resource support.

Equally, our Turnkey Systems Division provides total U.K. coverage,

ANALYSTS & PROGRAMMERS**BIRMINGHAM**

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We currently have a large volume of vacancies throughout the Birmingham and West Midlands regions, including a wide variety of new jobs at the rapidly expanding E.M.S. Data Centre. COBOL and ASSEMBLER programmers should complete our applications forms today as an urgent priority. We have an unparalleled range of vacancies available. In addition to hundreds of client vacancies, E.M.S. also has for candidates seeking the opportunities of constantly working on new development projects within a modern, attractively furnished Data Centre. Interviews are held daily at the Data Centre — Why not come along to discuss your career development prospects within the Midlands? E.M.S., as the largest recruitment consultancy in the country, has opportunities available for all O.P. staff which are unrivalled throughout the Midlands. Equally, please do not hesitate to complete and return today the attached application form. For only a few minutes initial correspondence the lucrative career opportunities will be forthcoming for you make your time worth the investment. Consultant Don Philp/John Wood.

10K-20K (and it is earnable!)

marketing Honeywell Level 6 mini-computer systems and supporting software to a wide range of U.K. users. Experienced Salesmen capable of developing their own territories are urgently required. A substantial quantity of leads are also supplied by extensive and vigorous advertising campaigns and Road Show venture Salesmen must possess an adequate mini-computer knowledge for Turnkey Systems positions. Cars will be provided with adequate base salaries and high prospective incentives. Apply by telephone for interview during the next week at our Birmingham Data Centre. All U.K. territories will be controlled from the pending regional development of other Centres. Consultant John Wood.

We have many contract vacancies advised each week. Telephone now for a Contractor's profile form urgently and we will offer you an unrivalled selection of opportunities each month. Even if you are not available for a month or two, register today and let us reserve top opportunities for you to be phased on to later. Telephone 0782-623665 (10 lines). Don Philp, Don Walklate, John Wood, Selina Mills.

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36 Fenchurch Street, London EC3.

**LONDON BOROUGH OF BARNET
Borough Treasurer's Department****COMPUTER STAFF**

This is a large Authority currently operating an ICL 1903T under George 3 running a variety of batch and terminal work and a comprehensive on-line enquiry system. We are upgrading to an ICL 2960 in September. Training in ICL 2900 and VME/B will be provided. There are vacancies for—

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Grade PD18 — £6346 to £6987 p.a. inc. (ref. 246)

Responsible for control and motivation of a small team responsible for telecommunications and software usage and development.

This is a senior appointment and we are looking for a person with at least 7 years' computing experience in systems and programming who has played a major role in implementing on-line systems using ICL 1900 equipment and communications facilities.

The appointed person will play an important part in transferring and setting up the new computer and will be expected to take an active part in on-line systems currently being developed.

SYSTEMS PROGRAMMER

Grade S.01 — £5517 to £5953 p.a. inc. (ref. 251)

A computer professional with at least 5 years' programming/systems experience to work in a small team designing and supporting applications systems.

A computer related degree or the NCC Certificate in Systems Analysis would be an advantage.

SYSTEMS ANALYST

Grade AP1/5 — £3108 to £3558 p.a. inc. (ref. 253)

A person with at least 2 years' experience in programming/systems analysis to work in a small team designing and supporting applications systems.

A computer related degree or the NCC Certificate in Systems Analysis would be an advantage.

PROGRAMMER

Grade AP1/5 — £3108 to £3558 p.a. inc. (ref. 255)

Two years' experience in 1900 Cobol and/or Plan required to assist in developing and maintaining a wide range of applications including conversion to 2960.

COMPUTER OPERATOR

Grade C.2 — £3228 to £4218 p.a. inc. (ref. 271)

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Separation allowance payable up to six months, or longer in exceptional cases. 100% of removal expenses, interest free loans for the purchase of annual or monthly season tickets, additional leave at public bank holidays.

Application forms available from Room 48, Borough Treasurer's Department, Town Hall, Hendon, London, NW4 4BG. Telephone: 01-202 6202; ext. 120, quoting reference number of post applied for. Closing date 4th August.

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POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
Scientific/Technical Programmers	to £7,000+	Technical Consultancy	Various S. of England	Minis/Micros	Scientific/technical programmers with minimum 2 years' assembly and preferably ALGOL, COBOL, FORTRAN, urgently required to work on a wide variety of projects. Excellent career prospects.	26/1
Standards Officers	c. £6,500+	Insurance	Essex	IBM OS	Unusual senior post for a self-starter with programming and analysis experience to develop and control standards covering all aspects of Data Processing including Operations.	29/2
Analyst/Programmers	£5,000+	Financial Services	London	Univac	Programmers with 2+ years' COBOL and preferably some FORTRAN needed for interesting development work using DB/Real Time/Batch processing.	29/3
Systems Analysts	to £10,000+ TAX FREE + ACCOM. + + +	Bureau	Saudi Arabia	IBM DOS	Systems analysts with commercial/financial experience required for development projects. 1 year+ renewable contracts available. Interviews in London.	29/4
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Analyst/Programmers	to £7,000 +	Service Organisation	London	PDP11	Excellent career prospects for Analysts/Programmers with 2 years+ experience of BASIC+ and RATS to work on a wide variety of applications.	29/21
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**Great Opportunities
in Data Communications**

**Sales Executives
(NEW PRODUCTS)**

Area Sales Engineer

Product Applications Engineer

RACAL

Communicate with Racal

Racal-Milgo Ltd, a member of the internationally famous Racal Electronics Group, is a world leader in the field of Data Communications.

The Company's outstanding success and current expansion of its product range, gives rise to the following vacancies.

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To join the new division marketing computer controlled voice response systems for data entry and file enquiry applications.

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To operate in the South East from the Reading headquarters of the highly successful UK Sales team, selling Data Communications equipment to computer-based users.

Applications (male or female) should write with details of age, qualifications and experience, to: D.J. Kitchenside, Personnel Officer, Racal-Milgo Limited, Prospect House, Thorn Street, Reading, Berks.

Preference will be given to applicants with direct selling experience in data processing, Communications or electronics.

All sales positions carry attractive base salaries plus generous commission and company cars.

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To join the Engineering Group giving product support to the UK Sales Team.

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Our Client, the major UK manufacturer of mainframe and mini computers, are looking to significantly expand their activities. The New Business Sector with offices in North, South and Central London, Southampton, Bristol and East Anglia is seeking to recruit additional high quality sales executives.

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Interested applicants should contact Roy Highfield and interviews will be arranged as soon as possible.

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Responsible to the D.P. Manager for all programming activities on the site. Applicants should have in depth experience of I.C.L. utilities, systems programming, modular programming, structured design techniques and of 1900/2904 hardware.

Senior Programmer

Responsible to the Chief Programmer, with similar experience of the equipment and techniques detailed above.

Analyst/Programmer

To join our operations support team which entails user contact and responsibility for the enhancement of a wide range of applications systems.

Programming is in Cobol but some knowledge of Plan and/or RPG2 would be advantageous, especially for the Analyst/Programmer position.

The department runs a 2904 with tapes, large and small discs and communications equipment. Further hardware is on order.

Attractive salary and conditions of employment will be offered and will include pension and free life assurance schemes.

Applicants, both male and female, should apply to: The Recruitment Manager, Petter Refrigeration Limited, Hamble, Southampton SO3 5NJ. Tel: Hamble (042 122) 2061, Ext. 337.

PETTERS



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THE JOB is for energetic people with disciplined minds, who are capable of meeting the challenge of selling systems.

WE'RE NOT RIGID about age and qualifications, but the preferred range is 25-35, and applications from experienced computer industry salesmen are welcomed.

IF THE JOB appeals to you, please telephone our Commercial Manager, Michael Hunt, on Reading 598511 or write to him.

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Experience to date: (Last Position First)
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and Location _____ Mth/Year _____ Mth/Year _____

Date

Signature



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DATE

THE SALES BIT

Prospecting (2)—the first telephone call

THE telephone is a key device within the "pioneering" process. In most circumstances it is the salesman's essential link between "desk evaluation" and the first face-to-face contact with the potential client. In fact, the first telephone call to a prospect is, with the exception of the final close, the most important contact of all. If you get it wrong, you don't even get into the action, which, from a negative standpoint, is marginally preferable to getting into the action and losing the business.

What must be avoided at all costs is selling the product over the telephone!

It is so easy to get drawn into a sales presentation over the telephone when the prospect's response takes the form of a question. What is it? How much? Why should I? etc. The salesman has to be prepared for this and make it clear that the real benefits of his product can only be assessed once he has a real understanding of the prospect's business, and that is the reason for the suggested meeting.

If the salesman is selling a process control system, for instance, and addressing himself to the chemical industry, then his approach, which might also involve an initial letter, might be as follows:

Good morning Mr Prospect. My name is Fred, salesman from the Electronic Computer Company. Our process control system is bringing about considerable savings for a large number of chemical companies in both batch and continuous-flow production. I would like to meet you to discuss the ways in which we could provide similar benefits to your company. Would you prefer to see me next week or the week after?

It's always a good idea to end with an "assumptive optional close" so that the prospect is perhaps persuaded to decide when he should see the salesman; not if he should see him.

A device which has served me well in the past is to agree a "finishing time" as well as a "start time" to the proposed meeting. Suggest 45 minutes or whatever minimum is appropriate. This way the prospect will know what kind of time commitment he is agreeing to and will consequently be more relaxed and more inclined to say yes.

There are three other points to bear in mind. Firstly, the level of initial contact is often the highest point in the company hierarchy that the salesman will achieve, so he must make sure it is at the decision level, and that normally means the managing director.

Second consideration is whether the salesman can overcome the "protective secretary".

Thirdly, start with a KISS. Keep It Simple, Stupid. Otherwise, it could be the "Kiss of Death" for new account sales.

TRADER

Puzzle answer

THE three "intervals" between the four original figures — 345, 381 and 437 — must obviously be exactly divisible by the mystery number. So must the two intervals between the first three intervals, both of which total 36.

Now since the first four figures are mixed odd and even, the divisor must be odd if the remainder is constant.

The only factors of 46 are 2 and 23, so 23 is the required divisor giving a constant remainder of 4.

